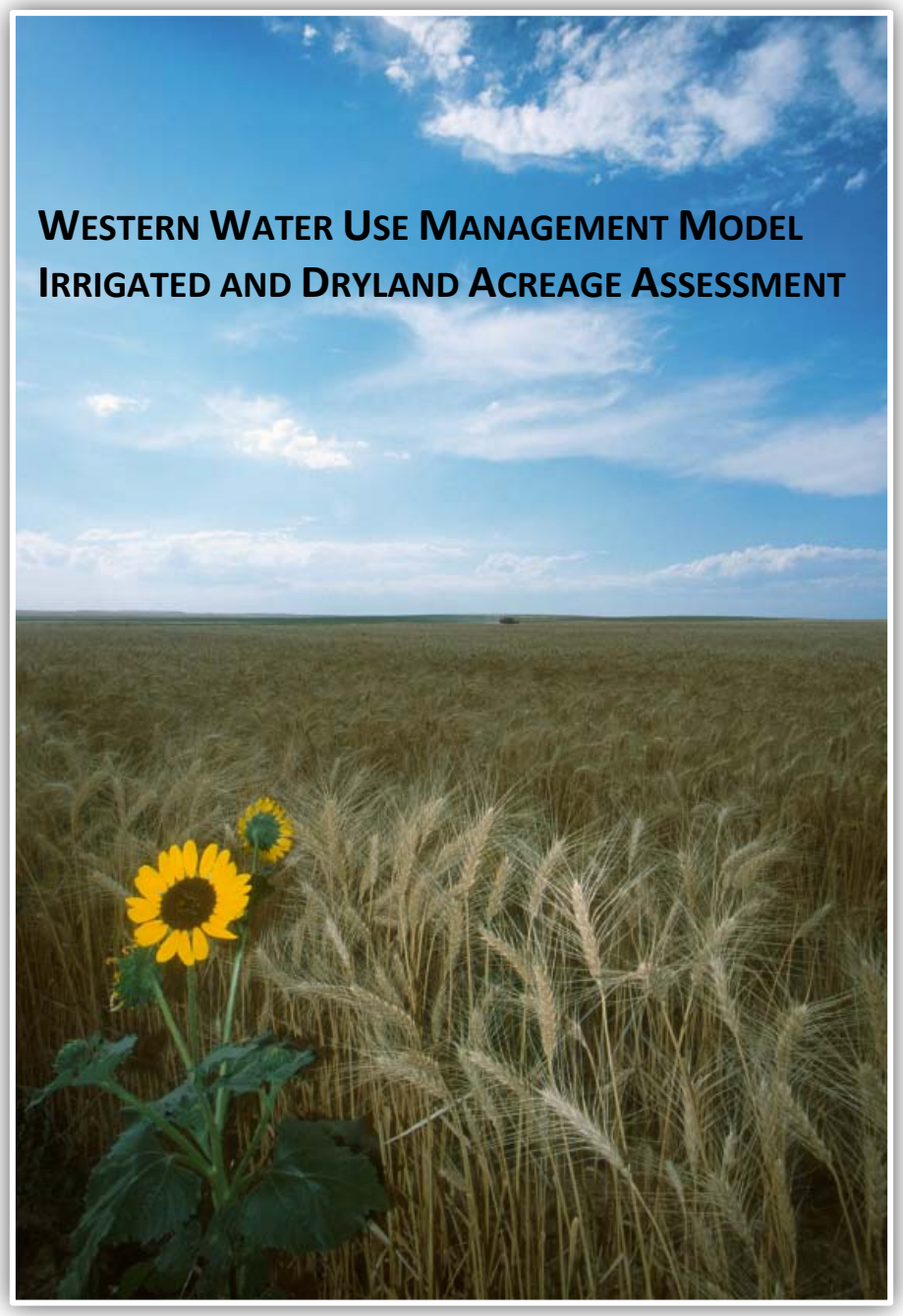

WESTERN WATER USE MANAGEMENT MODEL
IRRIGATED AND DRYLAND ACREAGE ASSESSMENT

Prepared for:

NORTH PLATTE AND SOUTH PLATTE
NATURAL RESOURCE DISTRICTS

May 2012

NORTH PLATTE AND SOUTH PLATTE NRD
IRRIGATED AND DRYLAND ACREAGE ASSESSMENT

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INTRODUCTION

An irrigated and dryland acreage assessment was performed for the North Platte and South Platte Natural Resources Districts (NPNRD and SPNRD, respectively) for the 1953 to 2010 period in order to develop spatial acreage information for the Western Water Use Management Model (WWUM Model) efforts in the districts. As water resources modeling in the NPNRD must take into account upstream uses, an assessment was also performed for the irrigated lands within the North Platte River basin in Wyoming. The goal of the acreage assessment was to determine accurate parcel boundaries based on aerial imagery and attribute those parcels with crop type, irrigation method and water supply. Acreage data, both irrigated and dryland parcels, will be used to estimate consumptive use, irrigation demands and recharge district wide. The resulting acreage information reflects the dynamic irrigation practices in the study area over time. This report discusses the methodology and results of this irrigated acreage assessment.

BACKGROUND

One of the critical pieces of information for water resources modeling is irrigated and dryland acreage, and how it has changed over time. Initial investigation into sources of acreage information was performed in support of the *Irrigated Acreage Assessment Recommendation Report* completed for the NRDs in June, 2010. In this report, sources of spatial and tabular irrigated acreage information for areas in Wyoming and Nebraska were compiled and assessed based on quality, area of shapefile and years available. The best sources of acreage information, an approach on how to use the information in the assessment, and an approach on how to develop new irrigated acreage information was recommended. These recommendations were further considered and expanded upon throughout the acreage assessment efforts, resulting in the approach and assessments discussed herein.

As discussed in the June, 2010 report, Wyoming acreage is important because water used in the lower North Platte reach in Wyoming affects surface water availability in Nebraska. Surface water availability in the North Platte River for diversion in Nebraska is impacted both by water that is diverted in Wyoming to irrigated lands in Nebraska as well as return flows from Wyoming irrigated lands. For these reasons, an irrigated acreage assessment was required for Wyoming, however not to the extent or detail as the assessment efforts in Nebraska, mainly due to the sensitivity of requesting Wyoming information.

Irrigated acreage information necessary for modeling efforts includes the amount of irrigated acreage served by surface or ground water sources, crop type, and irrigation application type over the study period. Ultimately, the acreage assessments developed for the NRD areas will be used in the WWUM surface water, ground water and consumptive use modeling efforts.

STUDY AREA

The irrigated acreage assessment study area encompasses all of the North Platte and South Platte NRD areas in Nebraska and the North Platte River valley from the Whalen diversion dam to the Stateline in Wyoming. The NRDs are located in the western panhandle of Nebraska, as shown in **Figure 1**, and encompass eight counties; Scotts Bluff, Banner, Morrill, Garden, the lower portion of Sioux county in NPNRD and Kimball, Cheyenne, and Deuel counties in SPNRD. The Wyoming lands are generally located in Goshen County in the southeastern portion of Wyoming, as shown in **Figure 2**.

STUDY PERIOD

The delineation of accurate parcel boundaries is highly dependent on the availability and quality of aerial imagery for the region. The earliest aerial imagery available in the NRD areas is 1953 and the most recent imagery is from 2010. Based on the availability of this imagery, as well as the availability of additional imagery throughout the study period in both the NRD areas and the Wyoming area, the study period for the WWUM Model acreage assessment was selected to be 1953 through 2010. The selected study period allows the NRDs to:

- Incorporate and use external sources of information that are available throughout the study period.
- Provide long-term acreage information to support modeling efforts that can span a variety of hydrologic conditions.
- Identify long-term trends in irrigation practices and track irrigated acreage served by ground water as it increases over time.

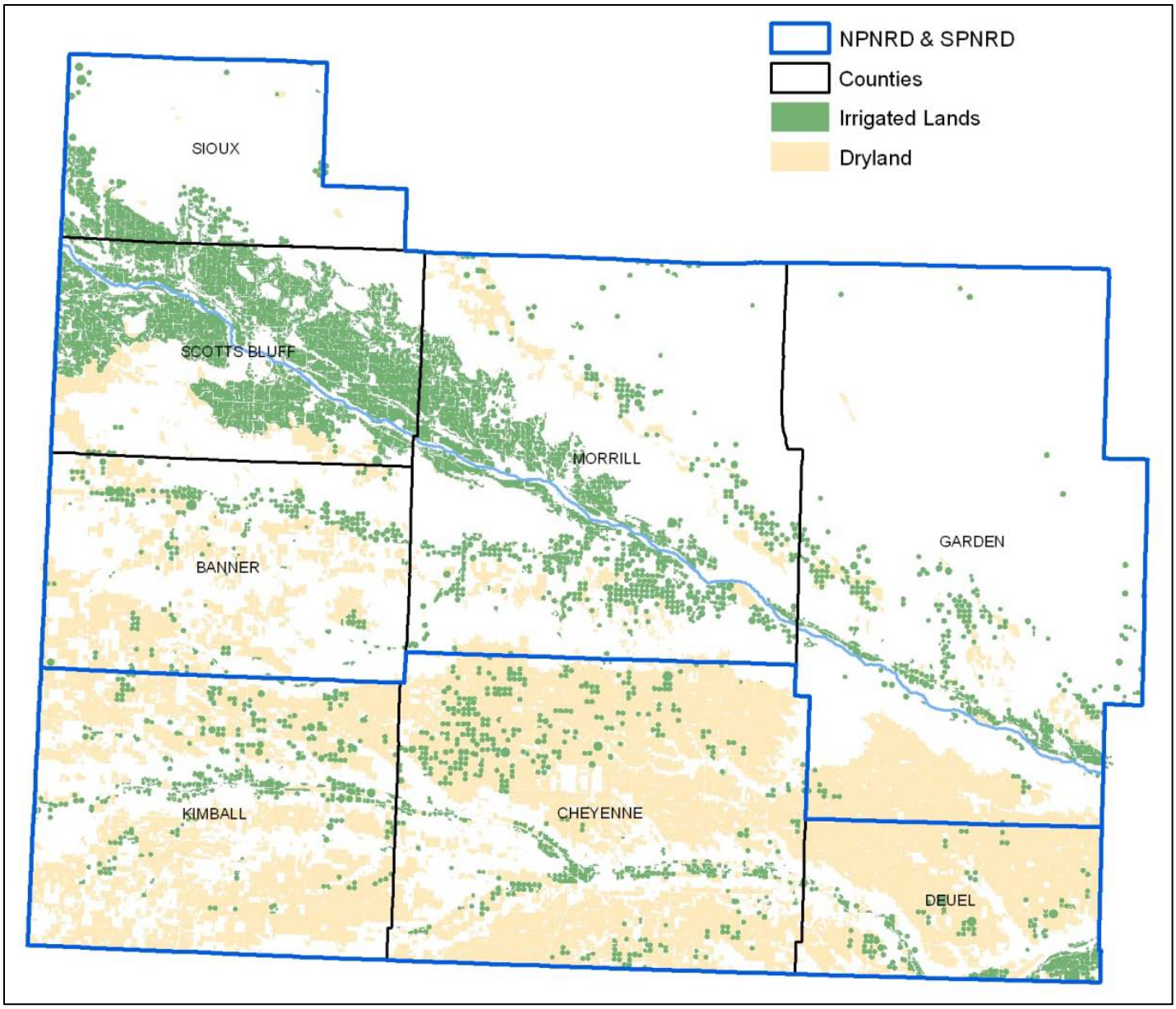

Figure 1: North Platte and South Platte Natural Resource Districts Study Area

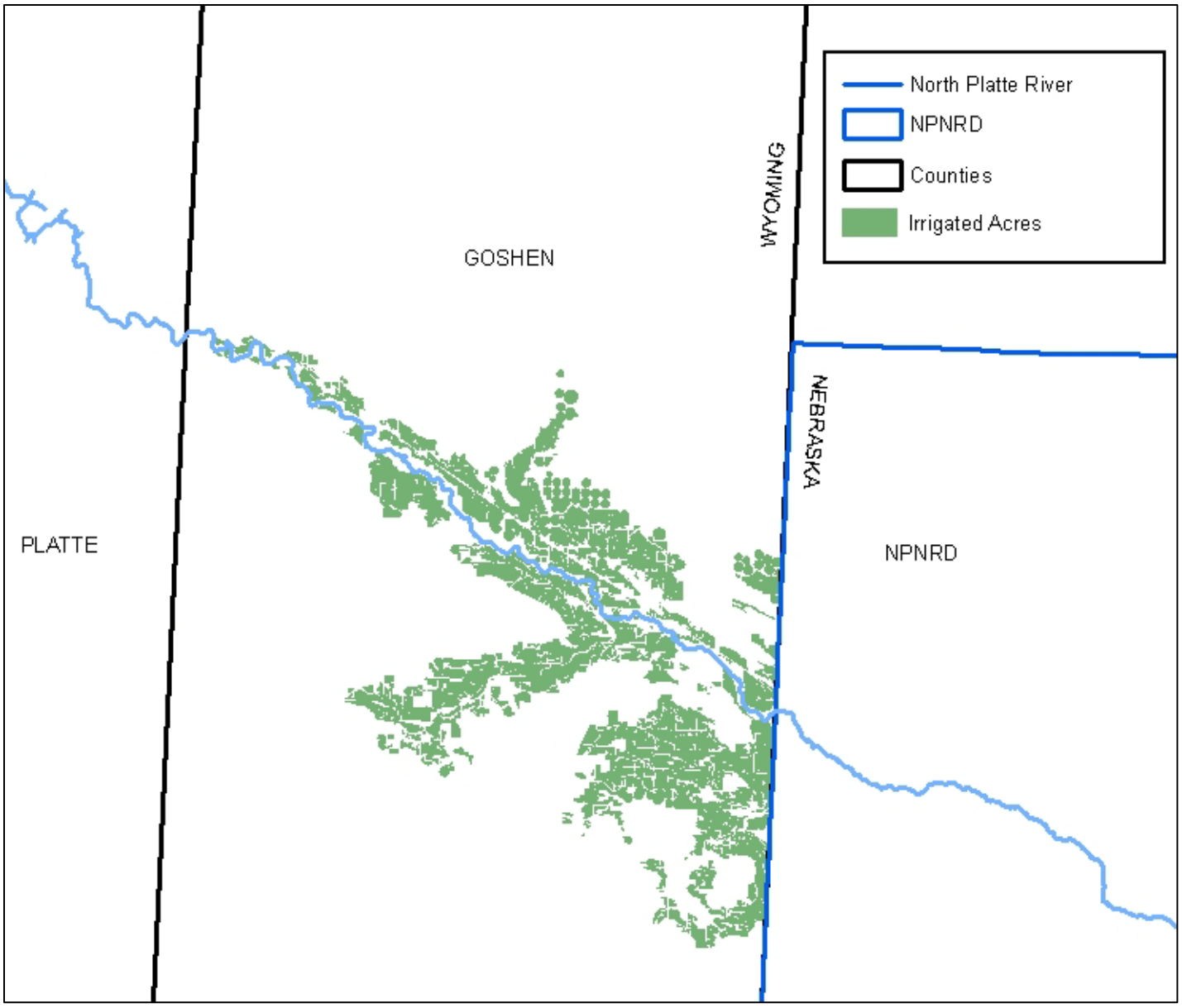

Figure 2: Wyoming Study Area

COMPILATION OF AVAILABLE INFORMATION

The first task in the acreage assessment was to investigate, understand and compile publically available sources of acreage information based on the attributes needed for modeling efforts. Information was available in spatial and tabular formats, as well as reported or anecdotal in nature.

This investigation and compilation effort was completed by LRE in June of 2010 and summarized in the *Irrigated Acreage Assessment Recommendation Report.* The entire content of the recommendations is not reiterated here, however the following generally summarizes the available sources of information and the approach taken to provide a recommendation. The recommendations were generally accepted by the NRDs, and, since the time of the report, have expanded to include dryland acreage in both NRD areas, irrigated lands in SPNRD, a 2010 assessment in both NRD areas, and the incorporation of historical pumping/usage information.

Eight sources were identified as having useful irrigated acreage information in the *Irrigated Acreage Assessment Recommendation Report*:

1. US Bureau of Reclamation (USBR) Information
2. North Platte River Return Flow Model (NPRRFM) Model
3. US Geologic Service (USGS) Land Use Information
4. National Agricultural Statistics Service (NASS)
5. Wyoming Framework Water Plan
6. Cooperative Hydrology Study/Center for Advanced Land Management Information Technologies (COHYST/CALMIT)
7. NPNRD Certified Acres
8. Aerial Imagery

These sources were assessed based on the following attributes:

- **Years Available:** Time period over which the data is available.
- **Area Extent:** The area extent that the source data includes (i.e. the surface water model study area, Wyoming portion, North Platte and/or South Platte NRD areas).
- **Parcel Boundaries:** Indicates whether the source data contains spatial polygons representing irrigated acreage parcel boundaries.
- **Water Source:** Indicates whether the source data contains an attribution of surface and/or ground water.
- **Structure Assignment:** Indicates whether the source data has been assigned to a specific surface or ground water structure.
- **Crop Types:** Indicates whether the source data contains an attribution of crop type.
- **Irrigation Method:** Indicates whether the source data contains an attribution of irrigation method; center pivot (sprinkler) or flood (other) irrigation.

Each source was evaluated based on the same general criteria and/or attributes and the results of this evaluation were presented in a matrix format in the report. Compilation and inventory of the current sources allowed for the determination of what information is available, the useful attributes

of each source, and how different sources may be used together to develop fully attributed irrigated acreage information.

In general, the report recommended that the irrigated acreage shapefile developed in support of the Wyoming Framework Platte River Basin Plan, based on 1994 aerial imagery, be used as the basis for the Wyoming acreage assessment efforts. The existing Wyoming shapefile has water source attribution via a linked table but does not include crop type and irrigation method attributes. The parcel boundaries in the shapefile appeared to accurately represent the irrigated acreage based on a cursory comparison to the 1994 DOQQ aerial imagery and the shapefile underwent more extensive review during the Nebraska vs. Wyoming litigation. It was recommended to refine this shapefile to explicitly attribute each parcel with water source and irrigation practice information. Discussion regarding the refinement of the existing Wyoming shapefile is provided below.

For the Nebraska lands, the report recommended that the 2005 irrigated acreage shapefile developed by CALMIT in support of COHYST and the NRD Certified Acreage shapefile both be used as the basis for the Nebraska acreage assessment efforts. Note that CALMIT is a unit of the University of Nebraska-Lincoln School of Natural Resources, which has contributed greatly to the land use and GIS information used for the COHYST efforts. These shapefiles provide the most complete spatial shapefiles of the NRD areas and provide a good starting point for irrigated parcel boundaries. In addition, the crop type and irrigation practice information developed through COHYST provide district wide information that can be used for parcel attribution. Reliable water source attribution of ground water supply is available from the NRD Certified Acreage datasets and well databases.

It was recommended that significant effort be invested to refine the 2005 parcel boundaries, as they will serve as the starting point for subsequent years. Once the 2005 parcel boundaries have been refined and reviewed, these parcels should be overlaid on the historical aerial imagery to determine if parcels have changed over time. Irrigated parcels should be removed, amended or added in the historical shapefiles based on this visual assessment of aerial imagery. Discussion regarding the refinement of 2005 acreage information and the approach used to develop the remaining acreage assessments in Nebraska is provided below.

HISTORICAL AERIAL IMAGERY

Several sources of historical aerial imagery were investigated in support of developing new spatial acreage information in the Nebraska portion of the study area. At the request of the NRDs, newly developed spatial information should provide a representative shapefile for each post-1950 decade, if possible, and reflect the period during which the development of ground water acreage increased and the period during which surface water acreage increased due to higher commodity prices. Using these constraints, available historical aerial imagery was investigated for the panhandle of Nebraska.

The *Irrigated Acreage Assessment Recommendation Report* summarized the historical aerial imagery available, the source for the imagery, and the imagery characteristics (e.g. scale, black and white vs. color). Individual historical aerial images must be purchased, generally from the USGS and the U.S. Department of Agriculture (USDA) through the Farm Service Agency (FSA), and then geo-referenced before they can be used in GIS. Recent imagery, 1993 through 2010, was publically available already spatially referenced from the Nebraska Division of Natural Resources (DNR) and through the Natural Resources Conservation Service (NRCS) Digital Data Gateway.

Based on the report recommendations and discussions with the NRDs, ultimately the following aerial imagery, shown in **Table 1**, was purchased or acquired by the NRDs in support of developing the acreage assessment.

Table 1: WWUM Model Aerial Imagery

Year	Source	Format [1]	Area of Shapefile Acquired
1953	USGS	B&W Images	North Platte and South Platte NRD
1975 [2]	USDA	B&W Images	North Platte NRD
1977 [3]	USDA	B&W Images	South Platte NRD
1984	USDA	IR DOQQ	North Platte and South Platte NRD
1993	DNR	B&W DOQQ	North Platte and South Platte NRD
1994	WYGISC	IR DOQQ	Goshen and Platte Counties, Wyoming
1999	DNR	B&W DOQQ	North Platte and South Platte NRD
2003	NRCS	Color NAIP	North Platte and South Platte NRD
2005	NRCS	Color NAIP	North Platte and South Platte NRD
2010	NRCS	Color NAIP	North Platte and South Platte NRD

[1] Format Types: Digital Orthophoto Quarter Quadrangles (DOQQ), Color Infra-red DOQQ (IR DOQQ), National Agricultural Inventory Program (NAIP), Black and White (B&W), Individual Aerial Images (Images)

[2] North Platte NRD Imagery for 1975 is a compilation of images from 1975, 1974, and 1973

[3] South Platte NRD Imagery for 1977 is a compilation of images from 1977 and 1973

Due to the large extent of the NRD areas, several hundred individual historical images were required to cover the NRD areas. A GIS subconsultant, Digital Data Services, Inc., was contracted to complete the geo-referencing work on the historical imagery. During the geo-referencing effort, the

pre-1984 aerial images were cropped to eliminate the frame. The result was a seamless image for all years of aerial imagery which could be used to delineate parcel boundaries.

The aerial imagery was available for areas with the majority of irrigated and dryland acreage in the NRD areas; however the imagery for the following areas were not available for specific assessment years.

- 1953 aerial imagery is missing for a two-mile wide area along the western-most border of Scotts Bluff, Banner, and Kimball Counties.
- 1975 aerial imagery is missing for northern half of Garden County and the north-eastern corner of Morrill County
- 1993 aerial imagery is missing for a three-mile wide area along the western-most border of Sioux, Scotts Bluff, Banner, and Kimball Counties.
- 1999 aerial imagery is missing for a three-mile wide area along the western-most border of Scotts Bluff, Banner, and Kimball Counties.

WYOMING IRRIGATED ACREAGE DEVELOPMENT

The Wyoming irrigated acreage assessment was completed using the existing Wyoming Framework Platte River Basin Plan Irrigated acreage shapefile. This irrigated acreage assessment was originally developed for the Wyoming State Engineers Office and Wyoming Water Development Commission in support of the Nebraska vs. Wyoming litigation and Platte River Basin Plan. The irrigated acreage assessment was based on 1992 through 1994 aerial imagery and included both delineation of irrigated lands and assignment of water supply sources.

Irrigated acreage in Wyoming was developed as the basis to providing an estimate of the consumed water in Wyoming, as it directly impacts the amount of water available to Nebraska. Dryland acreage generally does not have an impact on the surface water model, therefore dryland parcels were not delineated for the Wyoming acreage assessment. Irrigated acreage assessments were not developed for any other year in this area due to the limited focus on water use in the Wyoming portion of the study area.

The following discussion summarizes the process to refining the 1994 spatial irrigated acreage shapefile, assignment of attributes, and creating annual estimates of irrigated acreage for all the years in the study period.

REFINEMENT OF WYOMING IRRIGATED ACREAGE INFORMATION

Develop Base Acreage Shapefile for Study Area

The irrigated acreage information, both the spatial parcel boundaries and permit information, was developed for the entire Platte River basin in Wyoming, however only the downstream portion of the basin is needed for the surface water model efforts. Therefore the irrigated acreage and associated permit information was limited to the Wyoming portion of the study area. This includes the area from Whalen Dam to the Wyoming-Nebraska Stateline along the North Platte River, generally bounded on the north by Interstate Canal and on the south by Fort Laramie Canal. Lands served by wells only that are located beyond the canal boundaries, but close enough to the river to have a depletion effect were also included. **Figure 2** shows the extent of the Wyoming study area.

To develop a base acreage shapefile for the Wyoming study area, the lands in the study area discussed above were selected from the original irrigated shapefile. Next, this subset of parcels was linked to the table of surface and ground water permits assigned to each parcel using a unique identifier (Poly_ID) found in both the shapefile and table. The spatial shapefile is more useful for modeling efforts if the attributes reside directly in the shapefile, as opposed to having the permit information in a linked table. Therefore, all the available information from the permit table was permanently joined to the spatial shapefile. The table from Platte River Basin Water Plan Technical Memorandum 1.1, shown below in **Figure 3**, summarizes the information from the permit table that was joined via the unique identifier to the spatial shapefile. This process created a base irrigated acreage shapefile with associated attributes for the Wyoming study area.

Table 1.1.1 Irrigated lands Geographical Information System (GIS) attribute table

Irrigation Attribute Table (PLTirrag)	
POLYID (linking field)	Assigned number – unique for each polygon
SOURCE	Who created the original polygon delineations
AREA_METER	Area of the polygons in square meters (area values calculated in UTM, Zone 13, NAD 27)
AREA_FEET	Area of the polygons in square feet (area values calculated in UTM, Zone 13, NAD 27)
AREA_ACRES	Area of the polygons in acres (area values calculated in UTM, Zone 13, NAD 27)
Points of Diversion Attribute Table (PLTpods)	
PointID (linking field)	Assigned number – unique for each point
POINT_X	The longitude of the point (decimal degrees/NAD 27)
POINT_Y	The latitude of the point (decimal degrees/NAD 27)
Water Rights Table (PLTwtrrights)	
UniqueID (linking field)	Assigned number – representing a unique permit occurrence
PERMIT_NO	Permit number as assigned by the Wyoming State Engineer's Office (SEO). The word "None" or a blank in this field indicates there is no SEO permit information for this parcel of land.
SOURCE	Source of supply for appropriation. A blank or the numbers 999 in this field indicate that there is no SEO permit information for this parcel of land.
FACILITY	Facility name. A blank or the numbers 999 in this field indicate that there is no SEO permit information for this parcel of land.
PDATE	Priority date of appropriation in year, month and day (YYYYMMDD). The numbers 0 or 999 in this field indicate that there is no SEO permit information for this parcel of land.
PAMOUNT	Amount of appropriation. The numbers 999 in this field indicate that there is no SEO permit information for this parcel of land.
UNIT	Measure of appropriation in cubic feet per second (cfs), gallons per minute (gpm), or acre-feet (acft)
PACRES	Number of irrigated acres allowed under appropriation
TYPE	Type of supply of appropriation. Original supply (OS), supplemental supply (SS), secondary supply (SE) and additional supply (AS)
STATUS	Adjudicated (adj), unadjudicated (una), cancelled (can)
USES	Type of beneficial use – examples: irrigation (irr), domestic (dom), stock (sto), municipal (mun)
Source_Att	Name of firm responsible for compiling the data from SEO

Figure 3: Platte River Basin Plan GIS Attribute Table

Water Source Attribution

The base irrigated acreage shapefile contained assignments of surface water permits, ground water permits or both (co-mingled) to each parcel. For modeling purposes, it was necessary to assign each parcel to a single surface water structure. Likewise it was important to isolate parcels that were served only by ground water structures for the model.

In the original permit table, permits were assigned based on PLSS areas; any surface water permitted to divert at a rate of 10 cfs or greater was assigned to any parcel that is located within the PLSS area on the permit. This included original permits, permits for enlargements and permits for secondary supply from reservoirs. Any agricultural well having a permitted capacity of 50 gallons per minute or greater was also assigned based on the PLSS area on the permit.

Due to this assignment process, duplicate permits were assigned to a single parcel. In order to reduce the number of permits assigned to each parcel, and to ultimately assign the parcel to a single surface water source, the duplicate permits were eliminated from the attribute table.

Next, the multiple permit names, canal shapefile, general location of the lands and historical permit maps facilitated the development of a canal service area map. The canal service map was developed using this source information along with a visual assessment of the lands and their proximity to canals, and resulted in a list of canal names for the surface water source assignment. **Figure 4** shows the service areas in Wyoming.

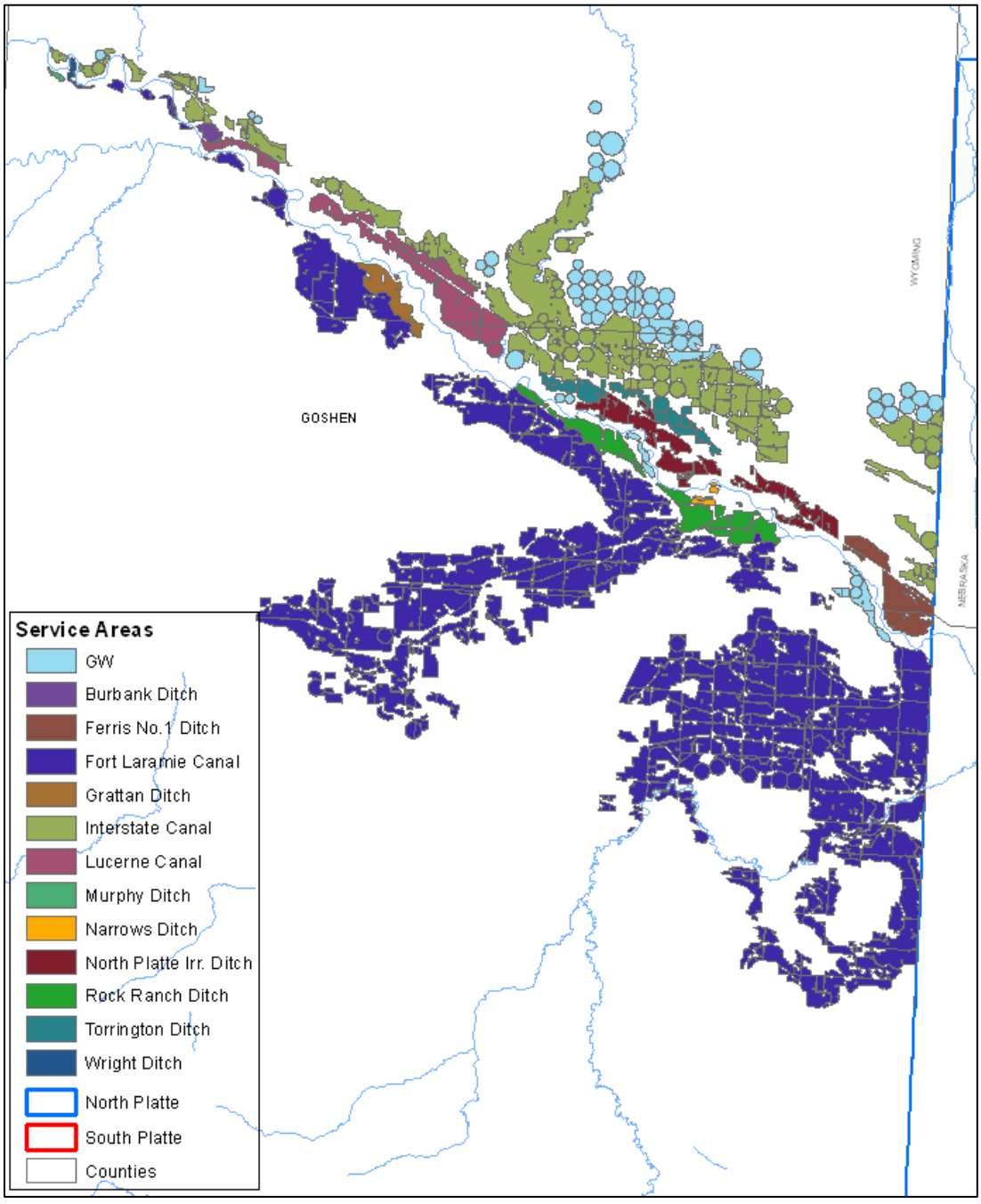

Figure 4: Wyoming Service Areas

The service area map was ultimately used to spatially assign a surface water source (SW_FAC) to each structure that was located within a service area boundary. Using the service area map to assign the surface water source allowed for a spatial review of the irrigated parcels to determine if any parcels overlaid two different surface water services areas. These parcels were split at the service area boundary and each parcel was then assigned to the correct surface water source. The list of canal names, shown in **Table 2** below, served as the list of surface water diversion structures in Wyoming to be used in the modeling efforts.

Table 2: List of Wyoming Surface Water Sources

Burbank Ditch	Fort Laramie Canal (Goshen Irrigation District)
Ferris No. 1 Ditch (Pratt-Ferris Irrigation District)	Interstate Canal (Wyoming Laterals, Hill & Lingle Irrig. Districts)
Lucerne Ditch	Grattan Ditch (New Grattan Ditch)
Wright and Murphy Ditch	North Platte Irrigation Ditch
Torrington Ditch	Rock Ranch Ditch
Narrows Ditch	

The original surface water permit information was not retained through the surface water source assignment process, however the unique Poly_ID was retained so that the original permit information in the linking table can still be accessed if need be.

Some surface water parcels are also served by ground water sources, also known as co-mingled parcels. The well information from the original linking table was retained and parcels were assigned the well name and permit number for up to 15 supplemental well structures. For co-mingled parcels that were split based on service area boundary, the spatial well shapefile was used to assess the locations of the wells assigned to the larger parcel and to determine how to reassign the wells to the split parcels.

Irrigated parcels that do not fall into a surface water service area are considered to be served only by ground water. The original PLSS permit assignment process for wells was performed in a similar fashion as the surface water permit assignment, resulting in multiple wells assigned to each parcel. The well name and permit number were retained from the original linking table and a maximum of 15 well structures were assigned to each ground water only parcel. If a ground water only parcel had greater than 15 wells assigned, the parcel was split and the spatial well shapefile was used to assign a smaller number of wells to each of split parcels. The resulting well name is assigned under the GW_FAC1 through 15 attributes, and the associated permit number is assigned under the GW_PER1 through 15 attributes.

Irrigation Method Attribution

Irrigation methods, used in the modeling efforts to determine irrigation application efficiencies, were assigned based on the identification of circular polygons served by sprinkler center pivots; all remaining parcels were assigned as a flood irrigation method. The irrigation method was assigned under the IRR_TYPE attribute.

QA/QC Based on Aerial Imagery

Wyoming aerial imagery from 1994, the same year reflected by the Wyoming spatial shapefile, was acquired during the irrigated acreage investigation and compilation efforts. A cursory review of the refined and attributed irrigated parcels was performed to assess the accuracy of the parcel boundaries. This review indicated that the detail taken when developing the spatial information for the Wyoming basin planning efforts was adequate for the WWUM planning model purposes. The parcel boundaries very closely matched the field boundaries on the imagery and a large majority of the irrigated acreage had been accounted for. Parcel boundary adjustments or the addition of irrigated parcels was not performed based on the review.

Externally Process Crop Type Attribution

Reliable spatial crop information was not available for the Wyoming portion of the study area. Although the NPRRFM information was recommended in the Irrigated Acreage Assessment memorandum, the limited number of crop types reported and the additional efforts associated with ditch specific crop mixes led to the determination that annual crop information as reported in *Post-Decree Changes in the Water Supply and Irrigation Development in the North Platte River Valley from Whalen, Wyoming to Lewellen, Nebraska* by Dr. Darrel Martin (Dr. Martin Report) would be used. The Wyoming Government Irrigation Districts crop summary from the Dr. Martin report was limited to the four majority crops and externally assigned to all irrigated parcels in Wyoming. The Wyoming irrigated acreage shapefile was not explicitly attributed with crop types. See **Appendix C** for additional information on how the Wyoming crop information was assigned.

SUMMARY RESULTS AND COMPARISON

The following tables summarize the resulting 1994 Wyoming irrigated acreage shapefile developed for the WWUM modeling efforts. **Table 3** summarizes the total irrigated acreage, by irrigation district and by irrigation method. As shown, in 1994, 60 percent of the irrigated land was served by Fort Laramie Canal in the Goshen Irrigation District, mostly through flood application methods, and 7 percent of the irrigated land was served by ground water supplies with over 80 percent of that land served by sprinkler pivots.

Table 3: 1994 Wyoming Irrigated Acreage Summary

Structure	Flood	Sprinkler	Total
Burbank Ditch	213	0	213
Ferris No. 1 Ditch (Pratt-Ferris Irrigation District)	1,878	0	1,878
Fort Laramie Canal (Goshen Irrigation District)	58,737	1,693	60,430
Grattan Ditch (New Grattan Ditch)	907	0	907
Interstate Canal (Wyoming Laterals, Hill & Lingle Irrig. Districts)	15,752	2,351	18,103
Lucerne Canal	3,709	122	3,831
Narrows Ditch	144	0	144
North Platte Irrigation Ditch	2,901	0	2,901
Rock Ranch Ditch	2,826	0	2,826
Torrington Ditch	1,392	134	1,525
Wright and Murphy Ditch	169	0	114
Ground Water Supplies Only	1,450	6,165	7,615
Total	**90,080**	**10,465**	**100,545**

Following the completion of the Wyoming acreage assessment, it is important to compare the results to other publically available sources of acreage information.

For Wyoming, these sources include:

- U.S. Bureau of Reclamation (USBR) – Annual acreage totals by district for the 1946 through 2005 period, provided in the *npdiv-del.xls* spreadsheet. Information available for districts that receive USBR Project water.

- North Platte River Return Flow Model (NPRRFM) – Annual acreage totals by district every five years for the 1977 through 1995 period, provided in the model documentation in Table 5.3. Modeled acreage is based on acreage information from the USBR and Dr. Martin Report, as well as from Nebraska DNR interviews.

- *Post-Decree Changes in the Water Supply and Irrigation Development in the North Platte River Valley from Whalen, Wyoming to Lewellen, Nebraska* (Dr. Martin Report) – Annual acreage totals by district for the 1946 through 1994 period, provided in the Supporting Tables of the report developed by Dr. Darrel Martin in February, 2000. Information based on USBR Crop Census Reports and Nebraska DWR Annual Reports.

Table 4 compares the Wyoming irrigated acreage for the WWUM modeling efforts to the acreage information developed by the USBR, reported in Dr. Martin's report, and the NPRRFM.

Table 4: 1994 Wyoming Irrigated Acreage Comparison

Irrigation District	WWUM Model (1994)	USBR (1994)	Dr. Martin (1994)	NPRRFM (1995)
Burbank Ditch	213	269	269	262
Ferris No. 1 Ditch (Pratt-Ferris Irrigation District)	1,878	-	-	1,655
Fort Laramie Canal (Goshen Irrigation District)	60,430	52,137	52,137	52,035
Grattan Ditch (New Grattan Ditch)	907	1,149	1,149	1,053
Interstate Canal (Wyoming Laterals, Hill & Lingle Irrig. Districts)	18,103	14,847	14,402	14,987
Lucerne Canal	3,831	3,684	3,683	3,906
Narrows Ditch	144	-	-	60
North Platte Irrigation Ditch	2,901	-	-	3,365
Rock Ranch Ditch	2,826	947	947	947
Torrington Ditch	1,525	1,682	1,682	2,058
Wright and Murphy Ditch	169	245	245	251
Total	**92,929**	**74,960**	**74,514**	**80,579**

Many of the surface water structures track closely with the other sources of reported information, including Burbank Ditch, Grattan Ditch and Lucerne Canal. The major differences occur on the larger canals, including Fort Laramie and Interstate Canal, whereby the WWUM Model acreage total was slightly larger than other sources. This may be due to USBR reported values, which are generally perpetuated by the other sources, reflects only the portion of land served by USBR project water.

NEBRASKA IRRIGATED ACREAGE DEVELOPMENT

The Nebraska irrigated acreage assessment used the Certified Acreage provided by the North Platte and South Platte NRDs as the primary source of spatial acreage information in the study area. The North Platte and South Platte NRDs developed spatial shapefiles of land that is served by a ground water source, generally based on 2005 aerial imagery. The remainder of the irrigated acreage information for 2005, as well as irrigated land in snapshots back in time, utilized information from COHYST and was based off of visual inspection of historical aerial imagery.

The approach for developing the irrigated acreage in Nebraska was to first develop the 2005 base shapefile of irrigated land, spending significant effort in quality control and review to accurately delineate the parcel boundaries. Then, this 2005 shapefile was used both forward and back in time as the starting point for each acreage assessment, and parcels were added, removed or refined based on the aerial imagery and certified acreage information.

The following discussion first summarizes the certified acreage information received from the NRDs and the development of ditch service areas, then discusses the process for developing the 2005 irrigated acreage shapefile, assignment of attributes to this base shapefile, and the creation of additional historical assessments for all the years in the study period.

CERTIFIED ACREAGE

The North Platte and South Platte NRDs undertook efforts to delineate the parcel boundaries of irrigated lands that are served by a ground water source. These irrigated parcels, referred to herein as "certified parcels" or "certificates", reflect the amount of land served by one or more assigned well, and are assigned a unique certificate number to facilitate NRD management. Certified parcels may be served by only ground water or may be co-mingled, although the source of surface water is not attributed in the shapefiles. The parcel boundaries were generally based on Common Land Unit (CLU) boundaries and 2005 aerial imagery and are the most reliable source of spatial irrigated acreage information in NRD areas. Although, the parcels in each NRD certified acreage shapefile represent land served by a ground water source, each NRD shapefile contains different attributes, discussed in more detail below.

North Platte Certified Acreage

The NPNRD certified acreage shapefile contains certified parcels located in the NPNRD boundary with the exception of the Pumpkin Creek basin which is represented by a separate certified acreage shapefile. **Figure 5** shows the original certified acreage shapefile, as received July 22, 2010 from the NPNRD.

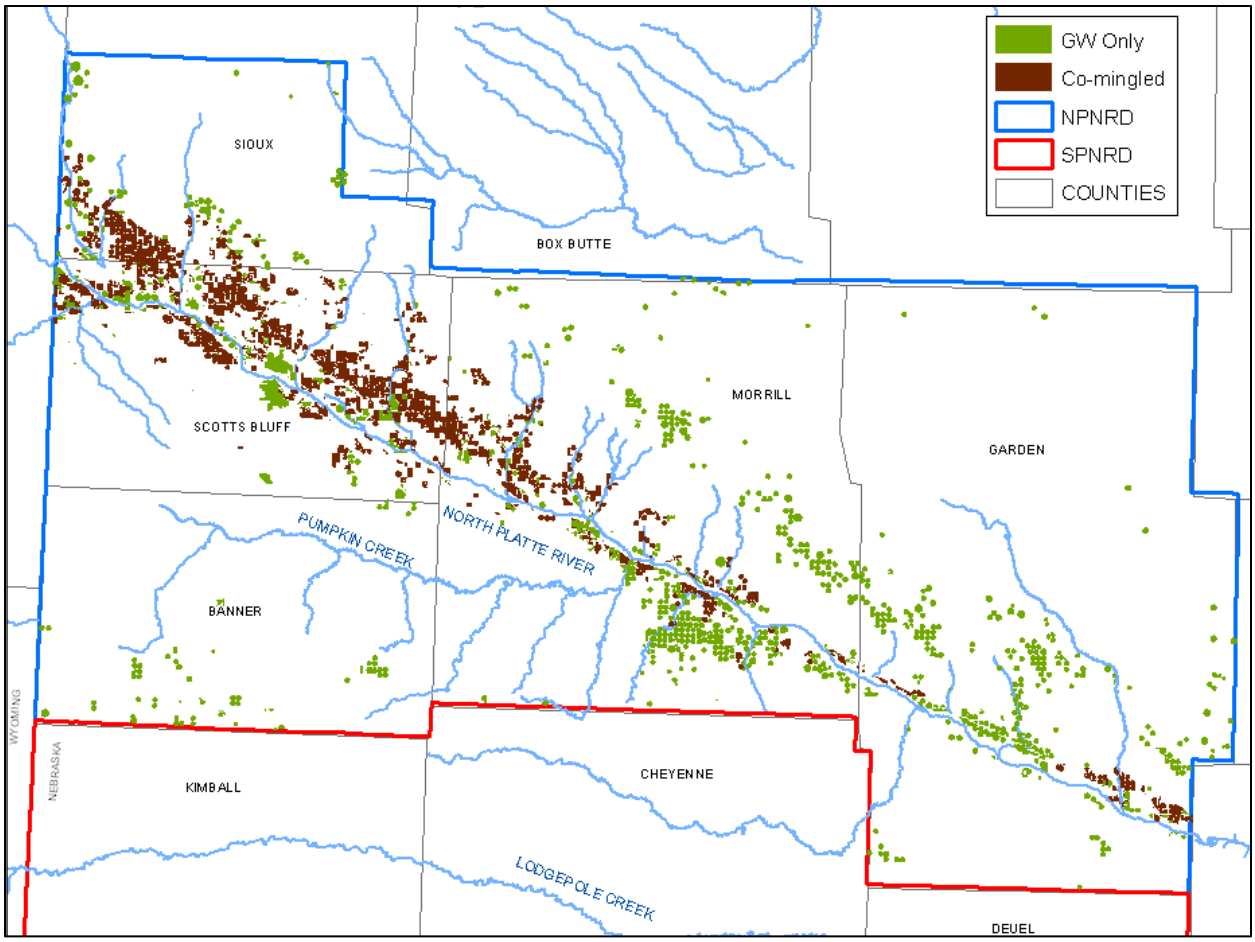

Figure 5: NPNRD Certified Irrigated Acreage

It is important to note that certifying acreage is a continuous process, and that changes to the certified acreage shapefile or associated well database after the above referenced date may not have been incorporated into the final shapefile. This supports the understanding that these base acreage shapefiles are intended for planning purposes, and not for administrative purposes. Additional review and upgrades to capture revisions to the certified acreage are needed before it can be used as an administrative tool.

The NPNRD certified acreage shapefile contained 1,808 certificates, representing over 221,000 acres of certified land. Note that more than one parcel may be included under a certificate, and all of the parcels under a certificate contain the same attributes. The acreage shapefile contained several attributes which, through discussions with the NPNRD, were reviewed prior to their use in the acreage assessment efforts. **Table 5** presents the shapefile attributes and descriptions.

Table 5: NPNRD Certified Acreage Attributes

Attribute	Description
Cert_Num	Certification number - a unique number assigned to each tract (multi-part polygon) certified for ground water use in the NPNRD
Surface_Wat	Surface water - a yes/no field. *Y* indicates that a tract also has surface water assigned as a source; also referred to as co-mingled tracts. *N* indicates the only source of water for this tract is ground water.
OA	Overappropriated Area – a yes/no field indicating whether the tract is in an Overappropriated Area
HYPERLINK	Hyperlink field that opens the scanned certification (pdf) when activated in GIS at the NPNRD
Date_Cert_1	Date the NPNRD board approved the certification
App_Num_1	Applicant/Owner Number – corresponds to an owner record in the NPNRD database
ContactID	Contact Number – corresponds to a contact record in the NPNRD database
DAUPECIT_1	Allocation Unit ID – allocation units that combine tracts and their water use
First_Irr_1	First Irrigation Date – contains the year the tract was first serviced (i.e. first irrigated) by a ground water well
CertifiedU	Certified Units – contains the units certified to each tract (e.g. units for irrigated tracts are acres)
CertType	Certification Type – indicates the type of certified ground water use (e.g. irrigation, feedlot, commercial, municipal)

Of the available attributes from the certified acreage shapefile, the certificate number, indication of surface water, first irrigated date and certification type were used in the development of the base 2005 irrigated acreage layer in the NPNRD area. The certification type was first used to remove any non-irrigation types. The remaining irrigated parcels then represented the ground water only and co-mingled parcels in the NPNRD area used in the assessment. **Appendix A** discusses the review, inventory, and quality control of the NPNRD certified acreage shapefile and the review of the first irrigation dates assigned based on corresponding DNR minimum well completion dates.

Pumpkin Creek Certified Acreage

Pumpkin Creek is a historically live creek that runs parallel and south of the North Platte River, and drains into the North Platte River downstream of the Town of Bridgeport. Due to the lack of streamflow in the creek, almost all of the irrigation in the basin is served by ground water only. Pumpkin Creek Basin is managed by the NPNRD as a ground water management sub-area, separate from the remaining NPNRD management area. As with the NPNRD shapefile, the Pumpkin Creek certified acreage shapefile reflects irrigated parcels served by one or more assigned wells; the parcel boundaries were generally based on Common Land Unit (CLU) boundaries and 2005 aerial imagery; certificates may be assigned to more than one parcel; and all parcels under a certificate have the same attributes. The Pumpkin Creek certified acreage shapefile contained 409 certificates, representing over 39,000 acres of certified land. **Figure 6** shows the original Pumpkin Creek

certified acreage shapefile, as received August 20, 2010 from the NPNRD. **Table 6** presents the shapefile attributes and descriptions for the Pumpkin Creek certified acreage shapefile.

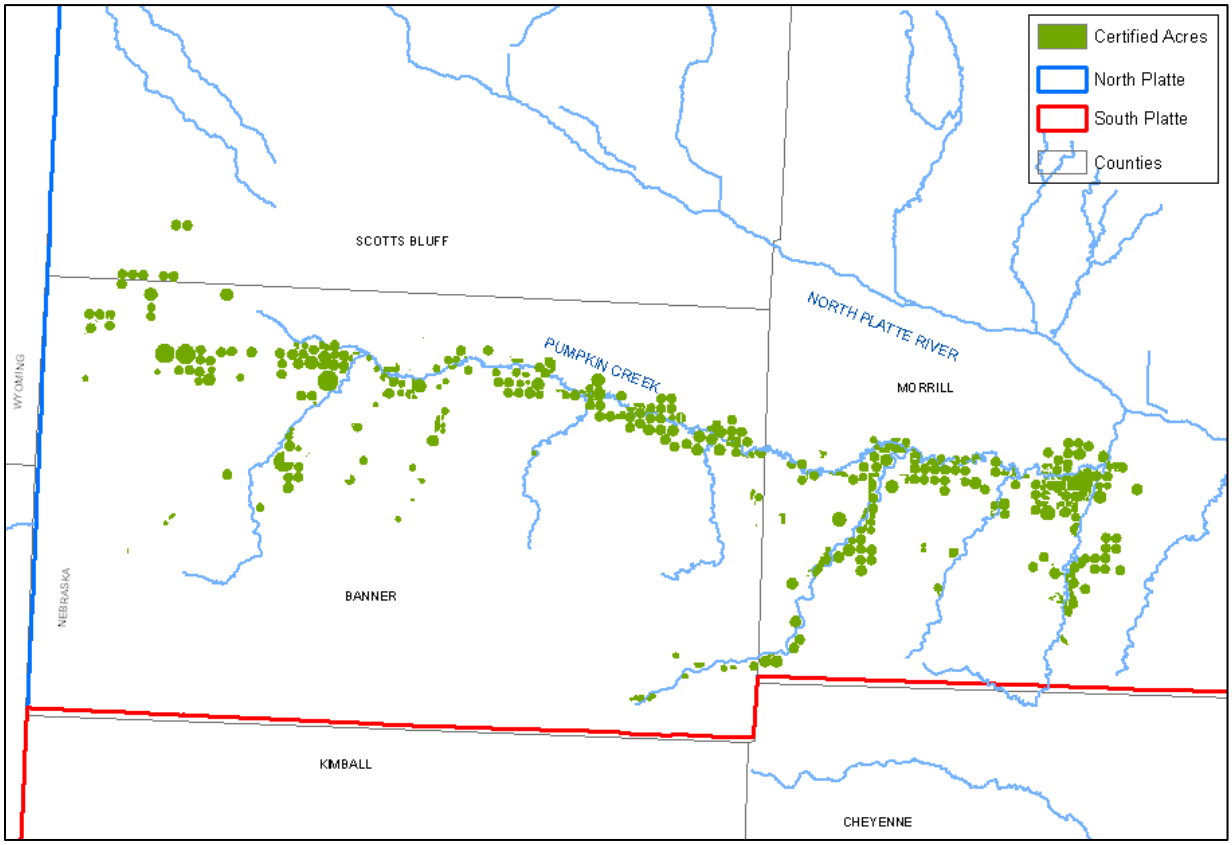

Figure 6: Pumpkin Creek Certified Acreage

Table 6: Pumpkin Creek Certified Acreage Attributes

Attribute	Description
Cert_Num	Certification number - a unique number assigned to each tract (multi-part polygon) certified for ground water use in the NPNRD
OA	Overappropriated Area – a yes/no field indicating whether the tract is in an Overappropriated Area
App_Num_1	Applicant/Owner Number – corresponds to an owner record in the NPNRD database
DAUPECIT_1	Allocation Unit ID – allocation units that combine tracts and their water use
CertifiedU	Certified Units – contains the units certified to each tract (e.g. units for irrigated tracts are acres)

Two attributes critical to the acreage assessment efforts were not present in the Pumpkin Creek certified acreage shapefile; first irrigation date and certification type. In the absence of a first irrigation date, the minimum well completion date from the DNR of the wells assigned to a

certificate was used to provide an estimate of the year that the parcel was first irrigated. In the absence of a certification type attribute, the wells assigned to each certificate were assessed using the Nebraska DNR well database to determine the permitted use associated with the assigned wells. Certificates with wells permitted for non-irrigation uses (e.g. domestic, industrial) were removed. The remaining irrigated parcels represented the ground water only and co-mingled parcels in the Pumpkin Creek Basin area. **Appendix A** discusses the review, inventory, and quality control of the Pumpkin Creek certified acreage shapefile and the development of the first irrigation date assigned based on minimum well completion dates.

South Platte Certified Acreage

The SPNRD certified acreage shapefile contains certified parcels located within the SPNRD boundary, as shown in **Figure 7**. The primary drainage basin in the SPNRD is Lodgepole Creek, a historically live creek that runs easterly through the NRD area before crossing into Colorado and draining into the South Platte River. As with Pumpkin Creek, the lack of streamflow in Lodgepole Creek results in almost all of the irrigation in the basin served by ground water only supplies. An exception to this is co-mingled land served by Western Canal in the extreme southeast corner of the NRD.

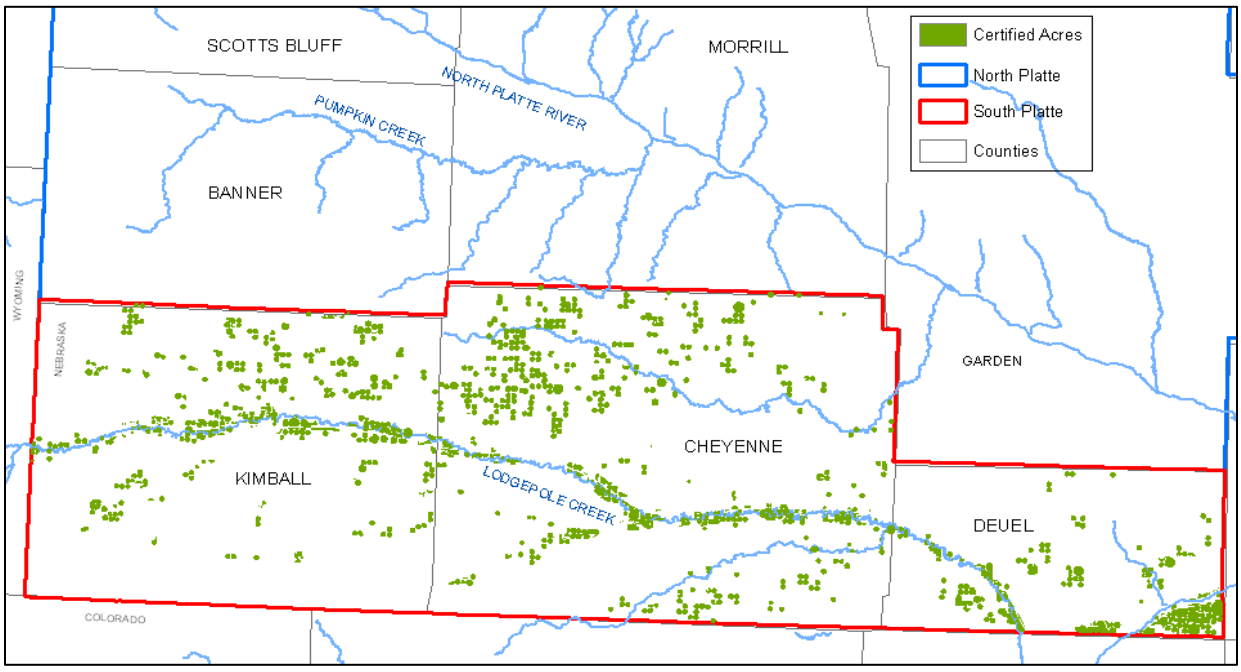

Figure 7: SPNRD Certified Acreage

The SPNRD methodology for tracking and managing certified parcels involves several shapefiles containing parcels that are currently active or those that have been transferred, retired or could be active in the future (i.e. Out of System parcels). LRE developed a memorandum of understanding, attached in to serve as the starting point of discussions with the SPNRD to fully understand the

information they provided on September 13, 2010. As with the NPNRD, the certification process in the SPNRD is dynamic and changes to the certified acreage or well database after the above referenced data may not have been incorporated into the final shapefile.

The result of conversations with the SPNRD prompted by the memorandum of understanding was to use the following shapefiles from the certified acreage geodatabase:

- SPNRD_CIA (876 certificates) – currently active shapefile,
- Out_of_System_CIA (84 certificates) – containing parcels without current allocations, or parcels that were historically active and may be active again in the future
- Transfers (19 certificates) – containing parcels where a portion of the parcel has been transferred to other uses
- Retired_Tracts (19 certificates) – containing parcels that were historically active but are now retired

The parcel boundaries in these shapefiles are generally based on 2005 imagery, and a majority of the active parcels in the base 2005 shapefile were gleaned from the SPNRD_CIA shapefile. The select shapefiles listed above contained 998 certificates, representing over 134,800 acres of certified land or historically certified land. **Table 7** presents the attributes that are populated in the SPNRD_CIA shapefile and associated descriptions.

Table 7: SPNRD Certified Acreage Attributes

Attribute	Description
ID	Certification number - a unique number assigned to each tract (multi-part polygon) certified for ground water use in the SPNRD, based on PLSS location of the parcel
Landowner	Name of landowner
OwnerID	Owner Number - this number corresponds to an owner record in the SPNRD database
Operator	Name of operator, if different than owner
OperatorID	Operator Number - this number corresponds to an operator record in the SPNRD database
Serial_Num	Flow-meter serial number
C_I_A	Certified Irrigated Acreage
Well_Reg	DNR well registration number
PoolingID	ID used for "pooled" or combined parcels
Subarea	Abbreviation for management sub-area
Comments	Text field used to capture SPNRD comments
SrfceRight	Surface water - a yes/no field. *Y* indicates that a tract also has surface water assigned as a source; also referred to as co-mingled tracts. *N* indicates the only source of water for this tract is ground water.
SW_Acres	Area in acres that can be served by surface water
HYPERLINK	Hyperlink field that opens the scanned certification (pdf) when activated in GIS at the SPNRD
Alias	Alternative certified parcel names

Attribute	Description
Irrigation_ Method	Method used to irrigated the parcels, includes pivot, gravity, or side roll
County	County parcel is located in
Appropriation	Indicates whether the parcel is in an area of fully or over appropriation
ProblemTract	True/False – indicates a problem with over or under usage of an allocation
Problem Description	Description of over or under usage of an allocation

Of the available attributes, the most useful for the assessment were the certificate ID and irrigation method. Similar to Pumpkin Creek, the first irrigation date was not available in the SPNRD shapefile therefore this date was calculated based on the minimum well completion date from the DNR database of the wells assigned to the certificate. **Appendix B** discusses the review, inventory, and quality control of the SPNRD certified acreage shapefiles and the development of the first irrigation date assigned based on minimum well completion dates.

DEVELOPMENT OF DITCH SERVICE AREA MAPS

Ditch service area maps are an important component to the development and attribution of the irrigated acreage. Mapping of service areas provides an area of land that could potentially receive irrigation water from each ditch. The service area is then used during the irrigated acreage delineation effort by indicating the areas that could receive surface water (i.e. lands outside of ditch service areas cannot receive surface water) and during the attribution process to assign a surface water structure to each irrigated parcel.

Ditch assignments developed for the COHYST effort served as the starting point for the ditch service areas in the North Platte basin. For questionable areas, permit maps reflecting the ditch service areas were used to refine the boundaries. Note however that permit maps were not used for all service areas, therefore the service areas do not exactly match the ditch permitted area. Further refinement to service areas was made based on geographical features (e.g. non-irrigable lands on high bluffs, ponds, ditches) and based on comments from Tom Hayden of the Nebraska DNR.

There was no information available for ditch service areas in Pumpkin Creek or Lodgepole Creek. Historically ditches existed and diverted surface water to serve irrigated lands within service areas along these creeks. To identify these historical service areas, it was necessary to pull permit maps for historical ditch structures and delineate historical service areas based on these maps. Available permit maps were provided by the SPNRD for Lodgepole Creek and Nebraska DNR for Pumpkin Creek. Note that Pumpkin Creek historical ditches that did not have an electronically available permit map were not included in the service area due to the difficulty in assessing a service area from a written permit description.

Service areas were used for surface water source attribution, and it was necessary to indicate the activity of the service area. The activity of the service area may be for the entire study period, such

as those service areas along the North Platte River, or for a historical portion of the study period, such as those historical services areas along Lodgepole Creek and Pumpkin Creek. **Table 8** summarizes the assessment years for which the service areas are active in the NPNRD area.

Table 8: Service Area Activity in the NPNRD

Ditch Service Area	Source	Active Assessment Years
Blue Creek	Blue Creek	Entire POR
Graf	Blue Creek	Entire POR
Hooper	Blue Creek	Entire POR
Paisley	Blue Creek	Entire POR
Union	Blue Creek	Entire POR
Weborg Pumps	Cedar Creek	Entire POR
McConnell Pumps	Deep Holes Creek	Entire POR
Capron Canal	Greenwood Creek	Entire POR
Meglemre Canal	Greenwood Creek	Entire POR
Nelson Canal	Greenwood Creek	Entire POR
Schuetz Canal	Greenwood Creek	Entire POR
Trinnier Canal	Greenwood Creek	Entire POR
Niehus Canal	Lawrence Fork	1953/1975
Randall Canal	Lawrence Fork	1953/1975
Redington Canal	Lawrence Fork	1953/1975
Spring Branch Creek	Lawrence Fork	1953/1975
Hagarty Canal Extension	Lower Dugout Creek	Entire POR
Hagarty Ditch	Lower Dugout Creek	Entire POR
Alliance	North Platte River	Entire POR
Beerline	North Platte River	Entire POR
Belmont	North Platte River	Entire POR
Browns Creek	North Platte River	Entire POR
Castle Rock	North Platte River	Entire POR
Central	North Platte River	Entire POR
Chimney Rock	North Platte River	Entire POR
Empire	North Platte River	Entire POR
Enterprise	North Platte River	Entire POR
Farmers	North Platte River	Entire POR
Gering	North Platte River	Entire POR
Gering-Fort Laramie	North Platte River	Entire POR
Lisco	North Platte River	Entire POR
Midland-Overland	North Platte River	Entire POR
Minatare	North Platte River	Entire POR
Mitchell	North Platte River	Entire POR
Ninemile	North Platte River	Entire POR
Northport	North Platte River	Entire POR

Ditch Service Area	Source	Active Assessment Years
Pathfinder	North Platte River	Entire POR
Ramshorn*	North Platte River	1953/1975
Shortline	North Platte River	Entire POR
Winters Creek	North Platte River	Entire POR
Airedale Ditch No1	Pumpkin Creek	1953/1975
Airedale Ditch No2	Pumpkin Creek	1953/1975
Court House Canal	Pumpkin Creek	Entire POR
Court House Rock Enlargement	Pumpkin Creek	Entire POR
Ehrman Pumps	Pumpkin Creek	1953/1975
Hoehn Pumps	Pumpkin Creek	1953/1975
Last Chance Canal	Pumpkin Creek	Entire POR
Laux Pumps	Pumpkin Creek	1953/1975
Meredith Ammer Canal	Pumpkin Creek	Entire POR
Nielsen Canal	Pumpkin Creek	1953/1975
Olsen Pumps	Pumpkin Creek	1953/1975
Peters High Line Lateral Ditch	Pumpkin Creek	1953/1975
Rodgers Canal	Pumpkin Creek	1953/1975
Rogers Cross	Pumpkin Creek	1953/1975
Sears Pump Ditch	Pumpkin Creek	1953/1975
Smith Wheeler Canal	Pumpkin Creek	1953/1975
Thurman Pumps	Pumpkin Creek	1953/1975
Wrights Canal	Pumpkin Creek	1953/1975
Big Horn Canal	Pumpkin Creek Trib.	1953/1975
Miller Canal	Pumpkin Creek Trib.	1953/1975

*After 1975 included as a part of Farmers

Service areas in the SPNRD area were active only in the 1953 and 1977 assessment years, with the exception of Western Canal, which is active for the entire study period. **Table 9** summarizes the service areas that were assigned in the SPNRD area, the associated permit numbers, and their activity in assessment years.

Table 9: Service Area Activity in the SPNRD

Ditch Service Area	Permit No.	Active Assessment Years
A - 12931 Well	A-12931	1953/1977
A - 16434 Well	A-16434	1953/1977
A - 3560 Well	A-3560	1953/1977
A - 6318 Well	A-6318	1953/1977
A - 7240 Well	A-7240	1953/1977

Ditch Service Area	Permit No.	Active Assessment Years
Adams Canal	D-371	1953/1977
Atkins Polly Canal	D-342, D-344, A-897R, P-174	1953/1977
Bennett Reservoir Canal	A-691	1953/1977
Bickel Faden Canal	D-347, A-719, A-724	1953/1977
Booth Canal	D-309 & D-310	1953/1977
Bordwell Canal	D-302 & D-303	1953/1977
Brady Canal	D-352	1953/1977
Bullock Canal	A-437 & D-296	1953/1977
Bushnell Canal	A-504	1953/1977
Christensen Canal	D-366 & D-367	1953/1977
Circle Arrow Canal	D-346R	1953/1977
Clauson North Side Canal	A-684	1953/1977
Clauson South Side Canal	A-683	1953/1977
Dickinson Canal No. 1	D-969	1953/1977
Dickinson Canal No. 2	D-967	1953/1977
Foster Wells	A-2200	1953/1977
Hoover Canal	D-353	1953/1977
Howard Canal	D-336	1953/1977
Hurley Lilly and Polly Canal	D-354 & A-4818	1953/1977
Johnson Canal	A-612	1953/1977
Kinney Canal No. 2	D-348 & A-718	1953/1977
Krueger Canal No. 1	D-325	1953/1977
Krueger Canal No. 2	D-324	1953/1977
Krueger Canal No. 3	D-323	1953/1977
Libby Canal	D-312	1953/1977
McAuliffe Canal	D-814	1953/1977
McIntosh Canal	D-351	1953/1977
Misegads Pump	A-9073	1953/1977
Nasland Canal	A-661	1953/1977
Neumann Canal	A-611	1953/1977
Neumann Canal No. 2	A-565	1953/1977
Neumann Canal No. 3	A-565	1953/1977
North Kimball Canal	A-897	1953/1977
Oberfelder Canal No. 1	D-307	1953/1977
Oberfelder Canal No. 2	D-333	1953/1977
Oberfelder Canal No. 3	D-306	1953/1977
Owasco Canal	D-347R	1953/1977
Persinger Canal	D-297	1953/1977
Ralton Canal	A-847	1953/1977
Runge Canal No. 1	D-339 & A-3363	1953/1977
Ruttner (new) Canal	D-350R, A-727, A-857, A-869	1953/1977

Ditch Service Area	Permit No.	Active Assessment Years
Ruttner (old) Canal	D-350	1953/1977
Smith Canal	A-850	1953/1977
Soderquist Canal	A-1237 & A-1420	1953/1977
South Kimball Canal	A-897	1953/1977
Sudman Canal	A-1483	1953/1977
Tobin Canal	D-330	1953/1977
Tracy Canal	A-870	1953/1977
Wertz Canal	A-600	1953/1977
Western Canal	A-393, A-1804, A-4739, U-21 Recharge Boundary	Entire POR
Wiegand Canal	A-563	1953/1977
Wiegand Canal No. 2	A-1323	1953/1977
Wiegand Canal No. 3	A-1322	1953/1977
Wilds Canal	A-904	1953/1977
Wolf Canal	D-813	1953/1977
Young Canal	D-349	1953/1977

The ditch service area shapefiles (NPNRD_Ditch_Service_Areas_01102012.shp and SPNRD_Serv_Area.shp) were provided to the NRDs as a deliverable of the acreage assessment effort. The ditch service area shapefile also contains information as to whether the service area will be used explicitly in the surface water modeling effort in the NPNRD area. This decision was based on whether sufficient information was known about the ditch and service area, including diversion records and water right permits.

IRRIGATED ACREAGE DIGITIZATION

Delineate 2005 Irrigated Acreage

The certified acreage shapefiles, refined by eliminating non-irrigation parcels, in the NPNRD, SPNRD and Pumpkin Creek basin areas served as the starting point of the development of the base 2005 irrigated acreage shapefiles. The 2005 aerial imagery for the Nebraska study area was used to visually inspect and manually delineate the irrigated acreage. Certified parcels were refined, as needed, to match the parcel boundaries on the imagery. Non-certified parcels were delineated based the following guidelines:

- Parcel must be within a ditch service area.
- Parks, cemeteries, gardens, golf courses, feedlots, and bodies of water were not included in this assessment.

- Parcel appears to be recently cultivated on the aerial imagery. This includes parcels with easily distinguishable row crops as well as fields that are more mottled in appearance indicating irrigated pasture land.
- Parcel does not have the identifiable dryland wheat/fallow striation.
- Areas with irrigated acreage as indicated by the COHYST/CALMIT Land Use shapefile was used as a reference.

Reviewing the aerial imagery for areas with known irrigated lands provided direction when assessing non-certified parcels. Typical characteristics on the imagery or an overall 'look' of the land for known irrigated parcels provided a gauge to determine whether a non-certified parcel should be delineated as irrigated. A majority of the non-certified parcels were easily determined to be irrigated, based on clear irrigation practices or distinct cropping patterns. Non-certified parcels that were more difficult to assess included those with limited crop growth, unclear field boundaries, a mottled appearance on the imagery, or the presence of drainages or elevation differences in the parcel. These parcels were flagged for external review, as discussed in more detail below.

Both certified and non-certified parcels were delineated based on field boundaries. The COHYST/CALMIT Land Use shapefile was used to further adjust or divide parcels based on crop information. This crop information was taken into consideration during the parcel delineation process in order to limit crop assignment issues. For irrigated parcels that showed a clear division of crop types, the parcel was split to explicitly represent each crop. For irrigated parcels with an ambiguous crop mix, the parcel boundary remained unchanged. The crop assignment of these parcels is discussed in more detail below.

Considerable time and effort was spent developing the certified and non-certified parcel boundaries for the base 2005 shapefile for both the North Platte and South Platte NRDs. The delineation efforts were generally performed at a 1:10,000 foot scale, a level of detail appropriate for planning purposes. Care was taken to maintain geo-spatial standards, including no overlapping parcels and correct topology.

Once the entire NPNRD, SPNRD and Pumpkin Creek basin area was visually reviewed, certified parcel boundaries were refined and non-certified parcels were delineated, the base 2005 shapefiles were complete and ready to be used as the basis for other assessment years.

Delineate Additional Acreage Assessment Years

In general, parcels in the North Platte area served by surface water have not significantly changed over time in the sense that parcels that were irrigated in 2005 were most likely irrigated back in time and continued to be irrigated through 2010. The major changes seen throughout time are the changes of parcel boundaries due to a transition from flood irrigation to sprinkler center pivots; the reduction in land due to an increased urban footprint; new land brought under production due to the development of ground water supplies; and the transition of surface to ground water supplies.

Assessment years throughout the study period allow the NRDs to have a "snapshot" in time that captures the progress of these changes. Assessment years, which include 1953, 1975(NPNRD), 1977(SPNRD), 1984, 1993, 1997, 2001, 2005 and 2010, allow the acreage dataset to be "updated" to reflect the current parcel boundaries and irrigation practices. The "updated" acreage information is then carried forward until the next assessment year.

Table 10 summarizes the imagery used in each assessment year to develop parcel boundaries. In some assessment years the imagery year does not correspond to the assessment year so the parcel boundaries are based on imagery of the subsequent year available (i.e. 1999 imagery was used to develop parcel boundaries for the 1997 assessment).

Table 10: Assessment Year Aerial Imagery

Assessment Year	Imagery Used to Develop Parcel Boundaries
1953	1953 B&W Images
1975 (NPNRD)	1975 B&W Images
1977 (SPNRD)	1977 B&W Images
1984	1984 IR DOQQ
1993	1993 B&W DOQQ
1997	1999 B&W DOQQ
2001	2003 Color NAIP
2005	2005 Color NAIP
2010	2010 Color NAIP

With the base 2005 shapefile complete, the draft 2001 shapefile was developed by first removing certified parcels with first irrigation dates greater than 2001 (i.e. parcels with first irrigation dates of 2002 would not be irrigated in 2001). The draft 2001 shapefile was then visually compared to the 2001 aerial imagery to determine the following changes:

- Changes to parcel boundaries
- Removal of parcels that were not irrigated
- Addition of parcels that were historically irrigated but not represented in the base shapefile

Remove, revise or add parcels manually as needed to the 2001 shapefile. Once these changes were completed, the 2001 shapefile then became the starting point for the 1997 assessment and the process was repeated with the 1997 aerial imagery. This approach was used back in time with the 1993, 1984, 1975/1977, and 1953 aerial imagery to develop the historical irrigated acreage assessments.

In the North Platte valley significant changes in acreage were made between the 1984 and 1975 assessments due to the flood to sprinkler transition seen at that time, and the transition from surface water to ground water supplies along Pumpkin Creek. Along Lodgepole Creek and in the

South Platte valley, significant changes were seen between 1977 and 1953 assessments due to the large number of wells that were constructed between the two assessments, and between 1977 and 1984 as a result of the transition from surface water to ground water supplies along Lodgepole Creek.

The original parcel boundaries were based on the 2005 certified parcel boundaries provided by the NRDs, as discussed above. At the time of the certification process, it was not envisioned that the parcel boundaries would reflect a varying amount of acreage back in time. As certified parcel boundaries changed historically, care was taken to maintain the amount of acreage assigned to a certificate. Visually if a certified parcel became inactive prior to its first irrigation date the parcel(s) were removed from the assessment. Active and inactive certificates were tracked in each assessment year. **Appendix A** and **Appendix B** contain a complete list of active and inactive certificates in each assessment year.

The 2005 base shapefile was also used to develop the draft assessment for 2010. As with the historical assessments, the draft 2010 shapefile was compared to 2010 aerial imagery and parcels were removed, revised or added as needed. Few parcels, if any, were added in either the North Platte or South Platte NRD areas due to the moratorium on new well development in 2004. Unlike historical assessments though, well pumping and CREP/EQIP information was provided for 2010 for both NRD areas to assist in determining irrigated parcels. In general, few changes were made between the 2005 and 2010 acreage assessments with the exception of excluding certified acreage with no recorded (inactive) pumping or parcels enrolled in the CREP or EQIP programs. **Appendix A** and **Appendix B** contain a summary of certified acres with inactive pumping and the CREP and EQIP acres that were accounted for in 2010.

IRRIGATED ACREAGE ATTRIBUTION

Once the base irrigated acreage shapefiles for each assessment year were developed, it was necessary to attribute the parcels with information pertinent to modeling efforts. **Table 11** summarizes the attributes assigned to the irrigated acreage shapefiles and a brief description. Each attribute and the attribution process is discussed in more detail below.

Table 11: Irrigated Acreage Attribute Table

Attribute	Description
Parcel_ID	Unique identifier for each spatial polygon
Cal_Year	Year of Assessment
Acres	Area of parcel in acres (calculated)
IRR_Type	Irrigation method, Sprinkler or Flood
SW	Served by surface water, Y/N
GW	Served by ground water, Y/N
Cert_Num or ID	Certification number or ID from Certified Acres
First_Irr	Year first served/irrigated based on NPNRD/SPNRD Certified Acres

Attribute	Description
Crop1-4	Crop type of parcel, up to four crops per parcel
Crop1-4 _COV	Percent of parcel with 'Crop1-4' grown
SW_FAC	Name of surface water structure serving parcel
GWID01-30	DNR Well ID of well serving parcel, up to 30 wells per parcel
URF_ID	Assignment to URF Zone
COUNTY	County that parcel is located in
SUBAREA	Administration Area (i.e. Pumpkin Creek, North Platte)
CRP_SRC	Flag indicating the source of cropping information

Water Source (SW, GW)

Designation of surface and/or ground water supplies is necessary to correctly match water supply to parcels in the modeling efforts. The following combinations of the SW and GW attribute were used in the acreage assessment:

- *SW = Y, GW = N*: Surface water only parcel
- *SW = Y, GW = Y*: Co-mingled parcel served by surface and ground water supplies
- *SW = N, GW = Y*: Ground water only parcel

For parcels along the North Platte River, this yes/no attribute was originally based on the designation from the NPNRD Certified Acres. This attribute was missing for the Pumpkin Creek and SPNRD area parcels, therefore basin knowledge, historical diversion records, and ditch service area maps guided the designation of surface and/or ground water supplies in these areas.

The designation of a specific parcel may change over time to reflect the conversion from surface water to ground water supplies. This conversion is accounted for using the activity of the service areas, as discussed in the service area development section above. In general, if a parcel was located in an active surface water service area, current or historical, the parcel was designated as *SW=Y* unless the original NPNRD certified acreage shapefile indicated that the certified parcel did not receive surface water. For example, a parcel located in a historically active ditch service area on Lodgepole Creek was designated as *SW=Y* in the 1953 through 1977 shapefiles; however this designation changed to *SW=N* in the post-1977 shapefiles once the service area was no longer active. This mirrors the conditions in the basin as the physical streamflow in Lodgepole Creek was reduced and the parcels were converted to ground water supplies.

Based on discussions with SPNRD there are no known currently irrigated co-mingled sprinkler pivots in the District. Only flood parcels that were within an active ditch service area were designated as co-mingled.

First Irrigation Dates (First_Irr)

The first irrigation date indicates the first year that a certified (ground water or co-mingled) parcel was actively irrigated. This year-date attribute is used to determine when certified parcels began

irrigating between assessment years. For example, a North Platte certified parcel with a first irrigation date of 1980 would not appear in the 1975 assessment, would appear in 1984 assessment, and would become active in the 1980 interim shapefile. By managing the first irrigation dates, the interim shapefiles between the assessment years would correctly reflect the addition of certified parcels over time based on the date they were first irrigated. Note that even though a parcel may have an active first irrigation date for a specific assessment year, it was not included in the assessment unless it was visually identified on the aerial imagery as irrigated.

As noted above, surface water only parcels are generally static over time and do not begin actively irrigating throughout the study period. For this reason, it was not necessary to attribute surface water only parcels with a first irrigation date. Any revisions, removal or additions for these parcels are only reflected in the assessment years.

In the NPNRD, the first irrigation date was provided in the original certified acreage shapefile. First irrigation dates for Pumpkin Creek and the SPNRD area were calculated based on the minimum DNR well completion date of the wells assigned to the certificate. The NPNRD first irrigation dates were also checked against the minimum well completion date and generally the first irrigation date was greater than or equal to the minimum well completion date (i.e. the well was actively irrigating after it was recorded as completed). At times, however, the first irrigation date, minimum well date and visual assessment date did not agree. This disagreement of dates was resolved in each basin with the assistance of the NRD staff and **Appendix A** and **Appendix B** lists the certificates and resolution for each instance where the dates disagreed.

Crop Assignments

The assignment of crop types to irrigated acreage is necessary to determine the net irrigation requirement (NIR) for the acreage in the NRD areas. An investigation of available historical tabular and spatial cropping data, as well as recommendations as to which cropping information should be used in the acreage assessment, was completed as a part of the *Irrigated Acreage Assessment Recommendation Report*. For more current assessment years, field-specific crop information was available. Specifically, the NPNRD collected crop information on select certified parcels along the North Platte River and Pumpkin Creek for the 2009 and 2010 growing season. The South Platte collected field-specific crop information on select certified parcels along Lodgepole Creek for 2007 through 2010 and for select parcels NRD-wide in 2009 and 2010. This field-specific crop information was incorporated when available and supplemented with additional data for recent assessment years. A discussion regarding all the sources of cropping information and assignment approach that were used in the current and historical acreage assessments follows.

In order for the user to determine which information was used for a parcel in any given year, a series of flags was included as an attribute (CRP_SRC) in both the NRD shapefiles. **Table 12** summarizes the crop flags and associated crop information source.

Table 12: Crop Information Flag Descriptions

Flag (CRP_SRC)	Crop Information Source/Description
1	Spatial crop information provided by North Platte or South Platte NRD assigned for the specified year (e.g. NPNRD 2009 crop information assigned in the 2009 shapefile)
2	Spatial crop information based on 2010 COHYST/CALMIT points
3	Spatial crop information based on 2010 CropScape Land Use grid
4	Spatial crop information provided by North Platte or South Platte NRD assigned to a proximate year (e.g. NPNRD 2009 crop information assigned in the 2008 shapefile)
5	Spatial crop information based on 2005 COHYST/CALMIT Land Use grid
6	Spatial crop information based on 2001 COHYST/CALMIT Land Use grid
7	Spatial crop information based on 1997 COHYST/CALMIT Land Use grid
8	Tabular crop information from Dr. Martin Report
9	Tabular crop information from County Agricultural Statistics
10	User-supplied crop information

USDA CropScape and NRD Crop Assignments (2010)

Three sources of spatial crop information were available for the 2010 acreage assessment and used to assign crops to irrigated parcels in the North Platte and South Platte NRD areas:

1. Crop assignments for certified parcels gathered by the North Platte and South Platte NRDs
2. Crop assignments for points on non-certified fields developed by CALMIT for COHYST
3. CropScape land use grid shapefile developed by the USDA

The certificate and field-specific assignments from the NRDs and CALMIT were applied first, then, if a crop was not assigned, an algorithm was used to assign a maximum of four crops from the 2010 CropScape grid to the remaining parcels. The algorithm, discussed in more detail in **Appendix C**, removes the non-crop types (e.g. roads, open water) from the CropScape land use shapefile and then assigns the four predominant crop types in each parcel.

The use of field-specific crop information for the 2006 through 2009 interim shapefiles is discussed below in the Nebraska Interim Acreage Development section.

COHYST/CALMIT Crop Assignments (2005, 2001, 1997, 1993)

Spatial crop information, based on Landsat imagery, was developed as part of CALMIT's Land Use Shapefile and is available for each of the COHYST irrigated acreage shapefiles. As discussed above, this land use shapefile was considered during the parcel delineation process in an effort to minimize the number of crops assigned to each parcel. A portion of the parcels could not be refined to a single crop based on the spatial crop information; therefore it was necessary to develop an algorithm to assign multiple crops to a single parcel. The algorithm, discussed in more detail in

Appendix C, assigns the percent of the four predominant crop types in each parcel. The algorithm was executed for the 2005, 2001, and 1997 COHYST/CALMIT Land Use shapefiles; note that the 1982 COHYST/CALMIT shapefile was not used to due to resolution issues. Due to similar parcel boundaries and land use characteristics, the 1997 land use shapefile was also used to assign crop information to the 1993 shapefile.

Historical Crop Assignments (1984, 1977/1975, 1953)

The investigation of both tabular and spatial historical cropping information available for the North and South Platte NRD areas resulted in a limited number of historical cropping information. The historical spatial land use information was limited due to poor resolution and cropping data generalities. The majority of the historical cropping information is from tabular sources. The irrigated parcels in the NPNRD are assigned cropping information based on tabular data using three approaches:

1. Tabular data for USBR-project ditches, summarized in the Dr. Martin Report, was limited to the four majority crops and assigned to all parcels located in each USBR-project ditch service area.
2. Parcels served by non-USBR-project ditches in close proximity to USBR-project ditches were assigned cropping information using a "nearest neighbor approach", as recommended in the Dr. Martin Report.
3. Parcels located farther away from USBR-project ditches were assigned cropping information, limited to the four majority crops, using County Agricultural Statistics based on the county the ditch service area is located in.

A map showing how the parcels in each ditch service area were assigned cropping information is included in **Appendix C**. All irrigated and dryland parcels in the SPNRD area, and all dryland parcels in the NPNRD area, were assigned cropping information, limited to the four majority crops, from County Agricultural Statistics. **Appendix C** describes how crop assignments were applied to the historical acreage assessments in detail.

Surface Water Structure Assignment

Parcels that are located within a service area were spatially assigned to the surface water structure based on the service area mapping. Although ground water parcels do not receive surface water (SW = N), if they were located within an active service area they were assigned to a service area in order to quantify the mix of surface water only, co-mingled and ground water only supplies in a service area. The ditch service area assignments were reviewed to visually to confirm the proper assignments. The surface water structure assignment generally consisted of the irrigation district or ditch name (SW_FAC) and also includes the permit number in the SPNRD. As noted in the service area discussion, only active service areas for the specific assessment year were used in the assignment process.

Ground Water Structure Assignments

Parcels that receive ground water as a supply, either solely or supplementing surface water supplies, were assigned a certificate number and well IDs based on information from the NRDs. In the NPNRD, the certificate number (CERT_NUM) is a four or five digit ID and in the SPNRD, the certificate number (ID) is a twelve digit alpha-numeric identifier that includes the township and range of the certificate plus a unique six digit numeric ID. Using the exact certificate numbers provides a link back to the NRD databases. The DNR and NRD well databases were used to relate the certificate numbers to the wells that serve the certified parcels. The unique registration number or "G-Number" was used to manage replacement wells and assign the well ID, up to 30 wells for a single certificate, in the shapefiles. **Appendix A** and **Appendix B** discuss the specific approach used to develop the certificate to well relationship.

In general, parcels where a surface or ground water sources could not be identified were not delineated as irrigated. In select instances when a non-certified parcel clearly served by a pivot was seen on the aerial imagery and could not be assigned to a certificate, this parcel was marked as non-certified irrigation and assigned a temporary certificate and well ID (99**). The intent of the non-certified irrigation was to identify parcels that were not included in the NRDs certificate process. Further discussion of the non-certified irrigation can be found in **Appendix A** and **Appendix B.**

Irrigation Type Assignment

Irrigation type was assigned to each parcel, represented by a *Sprinkler* or *Flood* designation. Irrigation type is necessary for the modeling efforts to assess irrigation application efficiencies. In the NPNRD area, irrigation method was determined by visual assessment of aerial imagery. In the SPNRD area, the original certified shapefile provided information on the irrigation type. This NRD information was used in more current assessments verified by visual assessment of the imagery; visual assessment of the imagery alone was used in the historical assessments in the SPNRD area.

URF Zone Assignment (URF_ID)

Unit Response Function (URF) zones were provided spatially by the NRDs based on the ground water model analysis. These zones represent an area where recharge experiences similar return flow timing and reaches the river at similar locations. URF zones, and the return flow information associated with each URF zone, are used in the WWUM surface water modeling effort to understand the timing and location of canal and irrigation return flows. The parcels were spatially assigned to a URF zone in each assessment year and the assignments were carried forward through the interim shapefiles. **Figure 8** shows an example area of irrigated acreage within the URF zones. URF zones were only assigned in the NPNRD, as the extent of the WWUM surface water modeling effort is limited to the NPNRD.

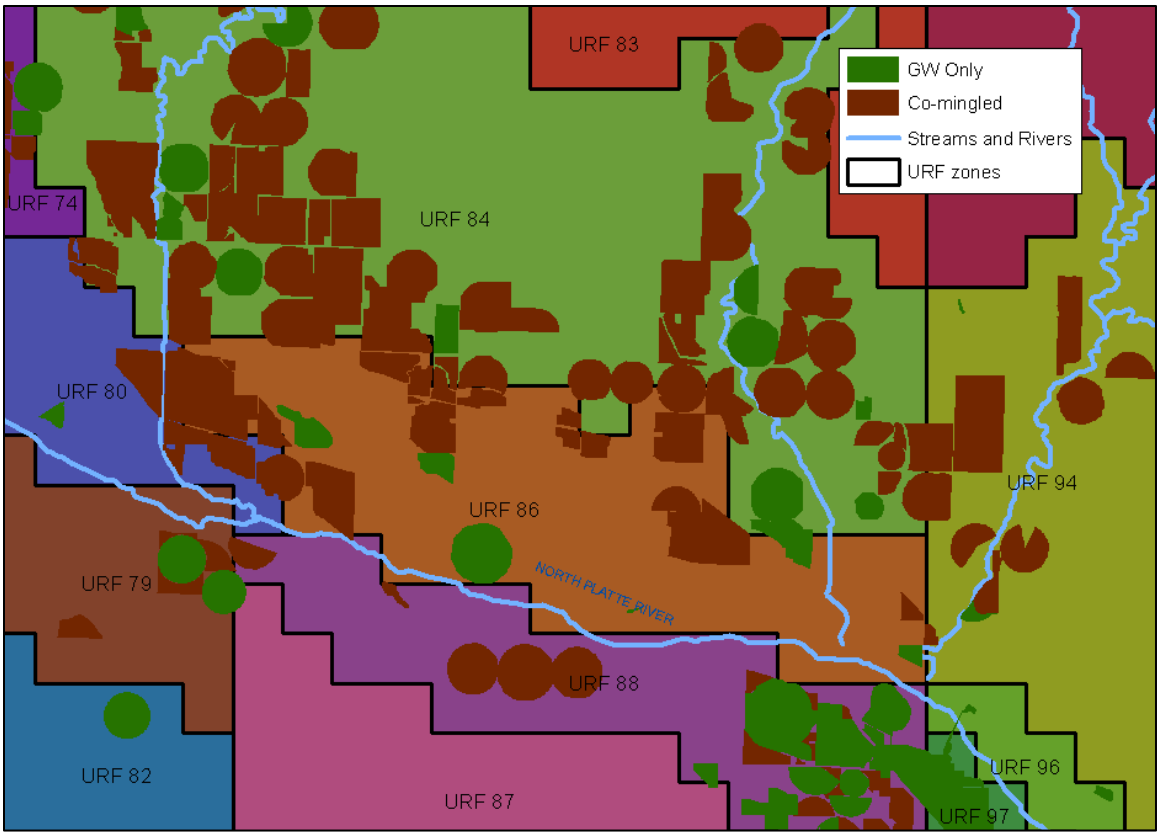

Figure 8: Example URF Zone

County Assignment (County)

Counties were spatially assigned using the centroid of each irrigated parcel and the statewide county shapefile. This allowed acreage totals to be summarized by county for comparison to other county-based acreage information. County assignments were visually reviewed to confirm correct assignments. County assignments were also used to assign historical cropping information.

GW Management Area Assignment (Subarea)

The North Platte and South Platte NRD have designated different management areas within their NRDs. This attribute in the acreage shapefile captures those management areas so that acreage totals can be summarized by the different management areas by the NRDs. The NPNRD management areas are based on basin, and include Pumpkin Creek, Greenwood Creek and North Platte River. The SPNRD management areas are generally based on county boundaries and river reaches. **Table 13** summarizes the management areas assigned in the SPNRD.

Table 13: SPNRD Management Subareas

Subareas	Description	NRD
FA-C	Cheyenne County Tablelands	SPNRD
FA-D	Deuel County Tablelands	SPNRD
FA-K	Kimball County Tablelands	SPNRD
PBOR	Wyoming Stateline to Oliver Reservoir	SPNRD
ORBB	Oliver Reservoir to Buffalo Bend	SPNRD
BBSID	Buffalo Bend to Sidney	SPNRD
SIDCO	Sidney to Colorado State Line	SPNRD
SPV	South Platte Valley (Western Canal)	SPNRD

NEBRASKA DRYLAND ACREAGE DEVELOPMENT

The area outside of the irrigated parcels in the NRD areas consists of either native vegetation or dryland farmed acreage. Dryland farming is the practice of cultivating a crop using precipitation alone, without the aid of irrigation supplies. The need for fallowing, or letting portions of a parcel remain dormant for a season or year, give dryland parcels their signature striped pattern as seen on the aerial imagery. Dryland acreage was delineated in the North Platte and South Platte NRD areas to develop a spatial shapefile of dryland parcels that are used to determine areas in the ground water model where the precipitation recharge may differ due to the presence of dryland compared to native vegetation.

DRYLAND ACREAGE DIGITIZATION

The approach to developing the dryland acreage assessment is similar to the irrigated acreage approach whereby the base 2005 dryland shapefile was developed first, then used both forward and back in time as the starting point for each acreage assessment. Based on the aerial imagery, dryland parcels were added, removed or refined. Unlike the irrigated acreage assessment, there was not an initial dryland shapefile as a starting point. In the NPNRD area, each dryland polygon was digitized based on the aerial imagery. In the SPNRD area, which has a much higher concentration of dryland parcels, the FSA 2010 common land use (CLU) shapefile was used as a starting point for dryland boundaries, which were revised to match the aerial imagery.

Dryland parcels were identified on the aerial imagery based on the presence of the cropping pattern and contours or ridges/furrows to capture precipitation, and the absence of any irrigation supplies. Dryland parcels were fairly easy to identify in more recent color or infrared aerial imagery, however the dryland parcels were more difficult to delineate from the historical black and white imagery. When a parcel appeared to be cultivated but was not supplied by a known irrigation supply, this parcel was included in the dryland shapefile. The identification of sub-irrigated lands was not completed for this assessment and may need to be addressed in the future.

DRYLAND ACREAGE ATTRIBUTION

Once the base dryland acreage shapefiles for each assessment year were developed, it was necessary to attribute the parcels with pertinent information. The dryland parcels will be used to assess precipitation recharge for the ground water model, which is dependent on the location of the parcels and crop types. Therefore, fewer attributes were assigned to dryland parcels compared to irrigated parcels. **Table 14** summarizes the dryland parcel attributes, discussed in more detail below.

Table 14: Dryland Acreage Attributes

Attribute	Description
Parcel_ID	Unique identifier for each spatial polygon
Cal_Year	Year of Assessment

Attribute	Description
Acres	Area of parcel in acres (calculated)
Crop1-4	Crop type of parcel, up to four crops per parcel
Crop1-4 _COV	Percent of parcel with 'Crop1-4' grown
County	Assignment to County
URF_ID	Assignment to URF Zone
CRP_SRC	Flag indicating the source of cropping information

Dryland Crop Assignments

An investigation of available tabular and spatial cropping data, as well as recommendations as to which cropping information should be used in the acreage assessment, was completed as a part of the *Irrigated Acreage Assessment Recommendation Report*. The sources of cropping information for dryland crops was very limited, generally only available from large scale land use assessments conducted for USGS, COHYST and Agricultural Census. The following sources were used to attribute crops to the current and historical dryland assessments in both the North Platte and South Platte NRD areas.

- 2010: Parcel-specific 2010 COHYST/CALMIT crop points were applied to the parcels first where available, and the USDA CropScape Land Use shapefile was used to assign a maximum of four crops to the remaining parcels.
- 2005, 2001, 1997, and 1993: COHYST/CALMIT Land Use shapefile was used to assign a maximum of four crops to the dryland parcels.
- 1984, 1977/1975, and 1953: Tabular crop information from County Agricultural Statistics

In general, the predominant dryland crop types assigned in the assessment were small grains and fallow lands. **Appendix C** discusses in detail the algorithm used to assign cropping information using the CropScape, COHYST/CALMIT land use shapefiles, and County Agricultural Statistics to each parcel.

URF Zone Assignment (URF_ID)

As discussed above, the URF zones were provided spatially by the NRDs based on the ground water model analysis. The dryland parcels were spatially assigned to a URF zone in each assessment year and the assignments were carried forward through the interim shapefiles. URF zones were only assigned in the NPNRD, as the extent of the WWUM surface water modeling effort is limited to the NPNRD.

County Assignments

Counties were spatially assigned using the centroid of each dryland parcel and the statewide county shapefile. This allowed acreage totals to be summarized by county for comparison to other county-based acreage information. County assignments were visually reviewed to confirm correct assignments. County assignments were also used to assign historic cropping information.

NEBRASKA ACREAGE QUALITY CONTROL AND QUALITY ASSURANCE

Review and quality control throughout the acreage assessment was an important component of the process to maintain the integrity of the entire dataset. LRE conducted several checks and reviews internally throughout the assessment to maintain the quality and accuracy of the shapefiles. These internal reviews included managing the numerous certificates and first irrigation dates over time, maintaining the topological integrity of the shapefiles, and correctly assigning attributes to each irrigated and dryland shapefile. In addition, LRE requested review from external sources, including the DNR and the NRD entities, to further review and assist with correcting questionable parcel delineations or attributions. The following discusses the internal and external review efforts for the acreage assessment.

INTERNAL REVIEW

Certification Check

A master table of certificates and first irrigation dates were compiled for both the North Platte and South Platte NRDs as a part of the initial certified acreage inventory (**Appendix A** and **Appendix B**). The master tables were related to each irrigate acreage assessment to confirm the correct certificates were active in each assessment year. This tabular check was important for representing the correct certificates and certificate attributes in the interim shapefiles. Throughout the project a visual assessment of certified parcels boundaries was made to manage the change in certified acreage back in time. In addition, a review of certificate IDs assigned to parcels were compared to the original shapefiles provided by the NRDs to confirm accuracy of the certificate ID assignment.

Topology

Topology, generally defined as the spatial relationships between adjacent or neighboring polygons, is extremely important to the integrity of the dataset. If neighboring polygons overlap, both polygons would reflect the overlap and attributes would be incorrect. Topology within each irrigated and dryland shapefiles, and the topology between the irrigated and dryland shapefiles was they were intersected, were extensively quality controlled to ensure correct topology. There were many quantitative and qualitative processes used to determine topological errors; these errors were reviewed and corrected in the final datasets.

Attribute Check

Once the assessment year shapefiles were completed, it was important to make sure the certificate acreage and ditch service area acreage were relatively consistent over time. Using an Access database, the assessment years were compiled and summarize by certificate and ditch service area. Each assessment year was then compared to the previous and subsequent year assessments, noting any discrepancies. Discrepancies were then reviewed to make sure the attributes were correctly populated.

Each assessment year was also visually reviewed to confirm attribution of flood and sprinkler, county, subarea, crops, ditch service areas, and URF zones. Once the final attribute tables were completed, the fields and data types were standardized for use with the interim tools.

EXTERNAL REVIEW

Due to familiarity with different aspects of the acreage assessment, multiple entities were asked to review specific portions of the acreage assessments. As the primary authority of surface water in the North Platte basin, Tom Hayden of DNR was asked to review lands served by surface water along the North Platte River and ditch service areas. LRE provided Tom Hayden with acreage maps indicating questionable areas of irrigated land and areas with questionable service area boundaries. Tom Hayden provided guidance as to whether the parcels were permitted to be irrigated, may be intermittently irrigated, or were not irrigated at all. Tom Hayden also provided permit maps and guidance as to the source of surface water for questionable parcels and service areas. Field visits by Thad Kuntz of the NRDs verified additional areas with questionable surface water parcels. The comments and information generated from the DNR review were incorporated into the acreage assessment and served as the review of surface water parcels in the North Platte basin.

Both the North Platte and South Platte NRDs were asked to review the irrigated acreage developed for each assessment year. The requested review had three objectives; to review whether information from the NRD certified acreage shapefiles was used correctly in the assessment, to review portions of irrigated and non-irrigated land within parcel boundaries, and to review the change in certified acreage over time. The requested review focused on the 1997 and more recent assessment years, due to the importance of this study period to the NRD Integrated Management Plan, and each NRD was provided with these assessment year shapefiles. The NPNRD reviewed the acreage in their NRD area and found that the assessment process discussed herein was sufficient in correctly delineating and attributed the irrigated acreage. General comments from the NPNRD regarding attribution consistency and integration of retired lands (e.g. CREP) were addressed and incorporated into the final assessment.

The complexity of attributes and information developed for the SPNRD certified acreage led to a more thorough review process of the SPNRD land. The SPNRD reviewed the acreage assessments and provided comment on the usage of water use/pumping information, retired lands, certificate activity, and the non-irrigated portions of certified acreage. Parcel-specific comments, as well as attribute-specific comments, were addressed and incorporated into the final assessment.

NEBRASKA INTERIM ACREAGE DEVELOPMENT

As irrigated and dryland acres change over time, it is important to reflect those changes in between assessment years. With the development of irrigated and dryland acreage assessments completed, the assessments were used to construct interim datasets. In general, an approach of carrying forward parcel boundaries and attributes for both irrigated and dryland parcels, until a change in boundaries or attributes is known, was used to develop the interim shapefiles. Therefore, acreage information from a more historical assessment was carried forward in the interim datasets until the next assessment year, or until a certificate becomes active in an interim year. Interim datasets were created using ESRI model builder tools. Model builder is a simple platform that allows the user to develop geoprocessing tools by linking existing tools and scripts together. **Appendix D** describes each of the tools used to create the interim datasets and the process of running the tools.

The tools used first irrigation dates as an indication of when a parcel became active in between assessment years. Beginning with the 1953 assessment, active parcels in each year were selected using first irrigation dates (1954-1974) from the 1975 assessment and added to the 1953 assessment building the irrigated interim datasets. For example, to create the 1954 interim shapefile, the parcels with a first irrigation date of 1954 were selected from the 1975 assessment and added to the 1953 assessment. Then to create the 1955 interim shapefile, the parcels with a first irrigation date of 1955 were selected from the 1975 assessment and added to the 1954 interim data set. These steps were repeated for each year of the dataset 1953 through 2005 using all assessment years for both the North and South Platte NRDs. Interim datasets for 2006 through 2009 were developed by hand to exclude CREP/EQIP land and certificates with inactive pumping or no meters (i.e. wells serving ground water only lands with no meters were monitored by the NPNRD to confirm no pumping was occurring). Note that the interim shapefiles are topologically correct without overlapping polygons, however they do not represent an interpretation of historical imagery and should not be compared to such.

IRRIGATED

A tabulation of the resulting interim irrigated acreage assessments for 1953 to 2010 for North Platte and South Platte NRDs are summarized in **Table 15** and **Table 16** below. The summaries include the new co-mingled and new ground water only acreage that becomes active in each year, as well as totals for co-mingled, ground water, and surface water only acreage for each year. The summaries also include the new certificates that become active in each year and total certificates associated to irrigated parcels in each year based on first irrigation dates. Assessment years in bold text in the tables below are represent assessments from the aerial imagery, and are not calculated as a part of the interim dataset.

DRY LAND

As new irrigated parcels come under production or change over time, the geometry or topology between irrigated parcels and dryland parcels changes. To correct for these changes, a tool was

developed to remove dryland areas overlapping irrigated parcels. Between assessment years, dryland was only removed to account for the addition of newly active irrigated parcels, dryland acreage was not added back to any interim shapefiles due to the removal of a certified parcel.

CROPS

Historical interim irrigated and dryland shapefiles between 1953 and 1992 were processed outside of the tools and assigned crops based on tabular crop information discussed above and in **Appendix C**. COHYST/CALMIT crop assignments for interim shapefiles between 1993 and 2005 were carried forward from each assessment year using the interim tools. Crops for the 2006 through 2009 shapefiles were assigned outside of the tools using both cropping data provided by each NRD, and CropScape information when NRD data was not available. **Appendix C** summarizes the cropping data assigned in each interim data set.

WELL ASSIGNMENTS

Wells were assigned to the interim shapefiles outside of the tools, once the interim shapefiles were developed. A relational database, with certificate numbers tying wells to parcels, was used to develop a final well table for each irrigated interim shapefile. The final well tables reflect the time series of wells for each certificate active in the interim shapefiles. The development of the well time series is discussed in more detail in **Appendix A** and **B**.

Table 15: NPNRD Interim Irrigated Acreage Summary

Year	Add. Co-Mingled Acreage	Total Co-Mingled Acreage	Add. GW Only Acreage	Total GW Only Acreage	Total Add. Acreage	SW Only Acreage	Total Acreage	Add. Certificates	Total Certificates
1953	**1,440**	**22,538**	**994**	**8,189**	**2,434**	**299,647**	**330,374**	**21**	**276**
1954	5,545	28,083	895	9,084	6,440	294,055	331,222	56	332
1955	2,231	30,315	695	9,779	2,926	291,778	331,872	29	361
1956	2,322	32,637	832	10,611	3,155	289,275	332,523	32	393
1957	1,964	34,601	678	11,289	2,642	287,309	333,198	27	420
1958	246	34,847	672	11,961	919	286,789	333,598	11	431
1959	970	35,817	1,781	13,742	2,751	285,594	335,153	32	463
1960	5,015	40,832	2,281	16,023	7,296	280,689	337,544	63	526
1961	8,404	49,236	1,275	17,298	9,679	272,287	338,821	87	613
1962	430	49,666	1,364	18,662	1,793	271,732	340,060	11	624
1963	224	49,889	730	19,391	953	271,305	340,586	9	633
1964	1,710	51,599	1,240	20,631	2,949	269,643	341,873	28	661
1965	1,216	52,815	2,184	22,815	3,400	268,368	343,998	34	695
1966	76	52,891	1,636	24,451	1,712	268,240	345,581	12	707
1967	557	53,448	1,600	26,050	2,157	267,669	347,168	19	726
1968	492	53,940	3,722	29,772	4,214	267,060	350,772	33	759
1969	609	54,548	3,497	33,270	4,106	266,610	354,429	38	797
1970	1,606	56,155	3,090	36,359	4,696	264,240	356,755	38	835
1971	608	56,763	2,207	38,566	2,814	263,638	358,967	22	857
1972	366	57,128	3,529	42,095	3,894	263,159	362,382	28	885
1973	505	57,634	6,263	48,358	6,768	262,285	368,276	43	928
1974	995	58,628	3,802	52,160	4,797	261,049	371,838	42	970
1975	**2,153**	**60,189**	**3,619**	**55,194**	**5,772**	**251,976**	**367,359**	**53**	**1026**
1976	497	60,686	11,861	67,055	12,358	248,788	376,529	105	1131
1977	3,553	64,240	3,745	70,799	7,298	244,850	379,889	66	1197
1978	1,039	65,279	2,056	72,855	3,095	243,872	382,007	24	1221
1979	671	65,950	3,903	76,758	4,574	243,195	385,903	43	1264
1980	777	66,726	2,790	79,548	3,567	242,154	388,429	25	1289
1981	827	67,553	6,193	85,742	7,020	240,946	394,241	63	1352
1982	1,382	68,935	1,509	87,250	2,891	239,687	395,872	26	1378
1983	371	69,306	2,043	89,293	2,414	239,327	397,926	19	1397
1984	**470**	**70,302**	**6,133**	**120,314**	**6,603**	**238,628**	**429,244**	**51**	**1612**
1985	548	70,851	805	121,119	1,354	238,173	430,142	12	1624
1986	27	70,877	440	121,558	467	238,146	430,582	4	1628
1987	299	71,176	227	121,786	526	237,724	430,686	3	1631
1988	152	71,328	402	122,187	554	237,445	430,961	5	1636
1989	5,947	77,276	1,088	123,276	7,036	231,530	432,082	60	1696

Year	Add. Co-Mingled Acreage	Total Co-Mingled Acreage	Add. GW Only Acreage	Total GW Only Acreage	Total Add. Acreage	SW Only Acreage	Total Acreage	Add. Certificates	Total Certificates
1990	5,614	82,890	1,582	124,858	7,196	225,860	433,608	57	1753
1991	2,679	85,569	1,169	126,026	3,848	223,076	434,672	29	1782
1992	3,774	89,343	1,151	127,177	4,925	219,611	436,131	34	1816
1993	**1,227**	**92,033**	**1,064**	**128,769**	**2,291**	**218,055**	**438,857**	**21**	**1835**
1994	1,356	93,389	1,318	130,088	2,674	216,754	440,230	26	1861
1995	832	94,221	1,614	131,701	2,446	215,944	441,866	22	1883
1996	1,311	95,532	2,118	133,819	3,429	214,525	443,876	31	1914
1997	**1,235**	**96,325**	**2,368**	**136,156**	**3,603**	**212,183**	**444,664**	**37**	**1944**
1998	657	96,982	1,062	137,218	1,719	211,555	445,754	18	1962
1999	508	97,489	632	137,849	1,139	210,966	446,304	11	1973
2000	1,040	98,529	1,418	139,267	2,458	209,595	447,391	30	2003
2001	**1,060**	**99,348**	**721**	**141,124**	**1,781**	**208,224**	**448,696**	**17**	**2024**
2002	8,752	108,100	2,357	143,481	11,109	199,875	451,456	91	2114
2003	6,192	114,291	0	141,450	6,192	193,753	449,494	69	2131
2004	269	114,560	172	141,622	440	193,485	449,666	3	2137
2005	**0**	**113,915**	**119**	**141,698**	**119**	**188,605**	**444,218**	**1**	**2130**
2006	0	113,692	0	139,658	0	188,301	441,652	0	2118
2007	0	113,692	0	138,855	0	188,301	440,848	0	2110
2008	0	113,630	0	138,995	0	188,048	440,673	0	2113
2009	0	113,587	0	135,608	0	187,861	440,221	0	2052
2010	**0**	**114,151**	**307**	**135,235**	**307**	**188,817**	**438,203**	**3**	**2047**

Note: The reduction in GW only acreage 2003-2010 is due to the exclusion of CREP/EQIP lands and certified acreage with inactive pumping records or no meters.
The additional ground water only acreage in 2010 is attributable to non-certified acreage identified in the 2010 assessment. The identified acreage will be resolved by the NPNRD.

Table 16: SPNRD Interim Irrigated Acreage Summary

Year	Add. Co-Mingled Acreage	Total Co-Mingled Acreage	Add. GW Only Acreage	Total GW Only Acreage	Total Add. Acreage	SW Only Acreage	Total Acreage	Add. Certificates	Total Certificates
1953	**72**	**5,860**	**835**	**15,425**	**21,286**	**10,875**	**32,160**	**13**	**199**
1954	96	5,956	342	15,767	21,723	10,792	32,515	6	205
1955	339	6,295	676	16,442	22,737	10,505	33,242	12	217
1956	276	6,571	607	17,050	23,621	10,262	33,883	11	228
1957	62	6,633	831	17,881	24,514	10,223	34,737	10	238
1958	214	6,847	239	18,119	24,966	10,027	34,994	7	245
1959	154	7,001	93	18,212	25,213	9,873	35,086	3	248
1960	257	7,258	280	18,492	25,750	9,689	35,439	9	257
1961	141	7,399	1,067	19,559	26,958	9,519	36,477	11	268
1962	53	7,451	212	19,772	27,223	9,467	36,690	5	273
1963	319	7,770	131	19,903	27,673	9,150	36,823	6	279
1964	0	7,770	1,848	21,752	29,522	9,102	38,624	19	298
1965	246	8,016	1,642	23,394	31,410	8,992	40,402	13	311
1966	94	8,110	456	23,850	31,960	8,900	40,860	5	316
1967	187	8,297	1,781	25,631	33,929	8,745	42,674	17	333
1968	202	8,500	2,748	28,379	36,879	8,646	45,524	24	357
1969	124	8,624	2,127	30,506	39,130	8,537	47,667	19	376
1970	0	8,624	1,740	32,246	40,870	8,537	49,408	12	388
1971	47	8,671	876	33,122	41,793	8,467	50,261	9	397
1972	55	8,726	3,357	36,479	45,204	8,430	53,635	25	422
1973	57	8,783	2,776	39,255	48,038	8,320	56,358	24	446
1974	277	9,060	7,048	46,303	55,363	8,047	63,410	59	505
1975	0	8,985	10,380	56,683	65,668	7,769	73,437	66	571
1976	570	9,555	7,791	64,474	74,030	7,408	81,437	64	635
1977	**158**	**8,697**	**1,988**	**68,779**	**77,476**	**6,004**	**83,480**	**24**	**663**
1978	0	3,941	6,645	75,424	79,365	370	79,735	15	678
1979	0	3,941	988	76,412	80,353	370	80,723	6	684
1980	0	4,091	1,745	78,157	82,248	220	82,468	13	697
1981	0	4,091	5,001	83,158	87,249	220	87,469	34	731
1982	0	4,091	2,211	85,369	89,460	220	89,680	12	743
1983	0	4,091	933	86,303	90,394	220	90,613	8	751
1984	**0**	**4,098**	**2,737**	**93,492**	**97,590**	**104**	**97,694**	**21**	**777**
1985	0	4,183	532	94,024	98,207	20	98,227	6	783
1986	0	4,183	141	94,166	98,348	20	98,368	2	785
1987	0	4,183	62	94,228	98,411	20	98,430	1	786

Year	Add. Co-Mingled Acreage	Total Co-Mingled Acreage	Add. GW Only Acreage	Total GW Only Acreage	Total Add. Acreage	SW Only Acreage	Total Acreage	Add. Certificates	Total Certificates
1988	0	4,183	673	94,901	99,084	20	99,103	4	790
1989	0	4,183	368	95,269	99,451	20	99,471	3	793
1990	0	4,183	1,899	97,168	101,350	20	101,370	12	805
1991	0	4,183	1,469	98,637	102,820	20	102,839	10	815
1992	0	4,183	1,318	99,955	104,137	20	104,157	9	824
1993	**0**	**4,145**	**140**	**101,342**	**105,487**	**14**	**105,501**	**2**	**819**
1994	0	4,145	1,577	102,919	107,064	14	107,078	9	828
1995	0	4,145	1,157	104,077	108,222	14	108,235	8	836
1996	0	4,145	1,972	106,048	110,193	14	110,207	11	847
1997	**0**	**3,506**	**1,188**	**106,130**	**109,636**	**0**	**109,636**	**10**	**833**
1998	0	3,506	746	106,876	110,382	0	110,382	5	838
1999	0	3,506	1,030	107,906	111,411	0	111,411	7	845
2000	0	3,506	1,217	109,123	112,629	0	112,629	8	853
2001	**0**	**2,669**	**1,222**	**113,927**	**116,596**	**0**	**116,596**	**7**	**856**
2002	0	2,669	2,503	116,431	119,099	0	119,099	16	872
2003	0	2,669	2,464	118,894	121,563	0	121,563	19	891
2004	0	2,669	3,542	122,436	125,105	0	125,105	19	910
2005	**0**	**2,116**	**0**	**123,524**	**125,640**	**0**	**125,640**	**0**	**902**
2006	0	1,077	0	122,131	123,208	0	123,208	0	862
2007	0	1,078	0	121,515	122,593	0	122,593	0	853
2008	0	1,034	0	120,846	121,880	0	121,880	0	841
2009	0	1,034	0	119,183	120,217	0	120,217	0	817
2010	**0**	**1,116**	**0**	**119,276**	**120,392**	**0**	**120,392**	**0**	**814**

Note: The reduction in GW only acreage 2006-2010 is due to the exclusion certified acreage with inactive pumping records.

IRRIGATED ACREAGE SUMMARIES

Irrigated acreage summaries have been prepared for both the North Platte and South Platte NRDs. The summaries provide a visual of the changes of irrigated acreage in NRD areas over time. Many different comparisons and analyses of trends can be performed by the acreage information available in the shapefiles; a portion of these comparisons and trends are illustrated graphically in this section. Analyzing these trends provides insight into how consumptive use, irrigation efficiencies, water supplies, and conversion of dryland acreage to irrigated acreage have occurred over the study period. In general, the following tables and graphics summarize the total irrigated acreage by water supply, crop type, irrigation application method and by county for the NPNRD and SPNRD areas.

Irrigated Acreage by Water Supply

Figures 9 and **10** summarize the trend of irrigated acreage by water supply and overall well development in the North Platte and South Platte NRD areas, respectively. Note the primary axis on the left denotes acreage, and the secondary axis on the right denotes the overall number of wells actively irrigating in each year. As expected, the acreage served by surface water only steadily decreases over time, especially in the SPNRD due to the decreased streamflow in Lodgepole Creek. By the late 1970's, the SPNRD acreage served by surface water had been converted over to receive ground water supplies, reducing the acreage served by surface water only to zero by 1997. Due to the extensive canal system in the NPNRD, a large amount of NPNRD acreage still receives surface water only supplies. Ground water acreage steadily increased in each basin, with the largest increase in the NPNRD in the early 1980's.

Note that the sharp increases in the graphs reflect the acreage delineation process, whereby wells that may have been constructed before an assessment year had no visible irrigated acreage until the following assessment year. Specifically, several wells with first irrigation dates of pre-1975 were not actively irrigating in the 1975 assessment but were identified as actively irrigating in 1984. This results in the dramatic increase in ground water only acreage in the early 1980's in the NPNRD, and correlates with the well development trend depicted in the figure. In the SPNRD, ground water acreage increased most dramatically from the mid-1970's to the mid-1980's, gaining nearly 40,000 acres in that period.

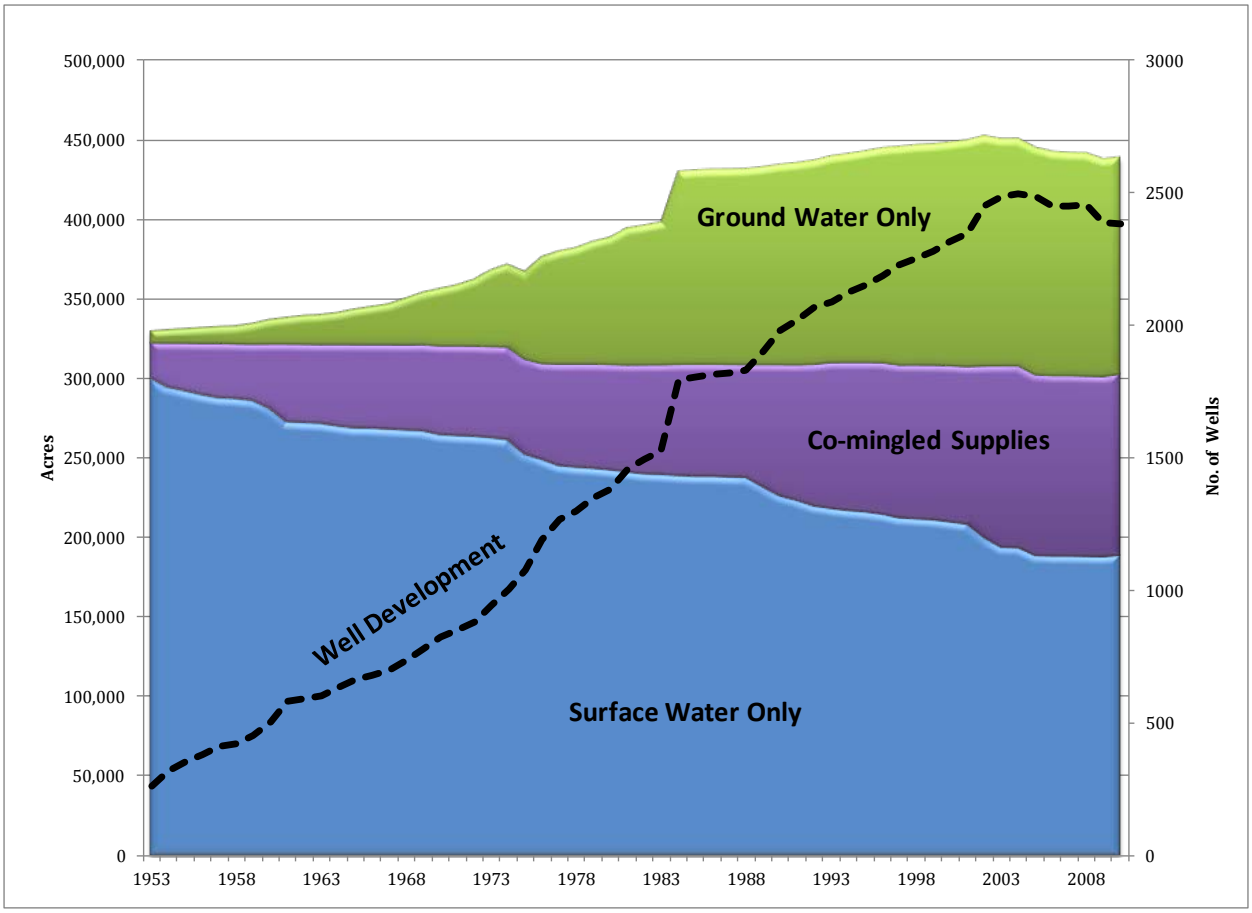

Figure 9: NPNRD Irrigated Acreage by Water Supply & Well Development

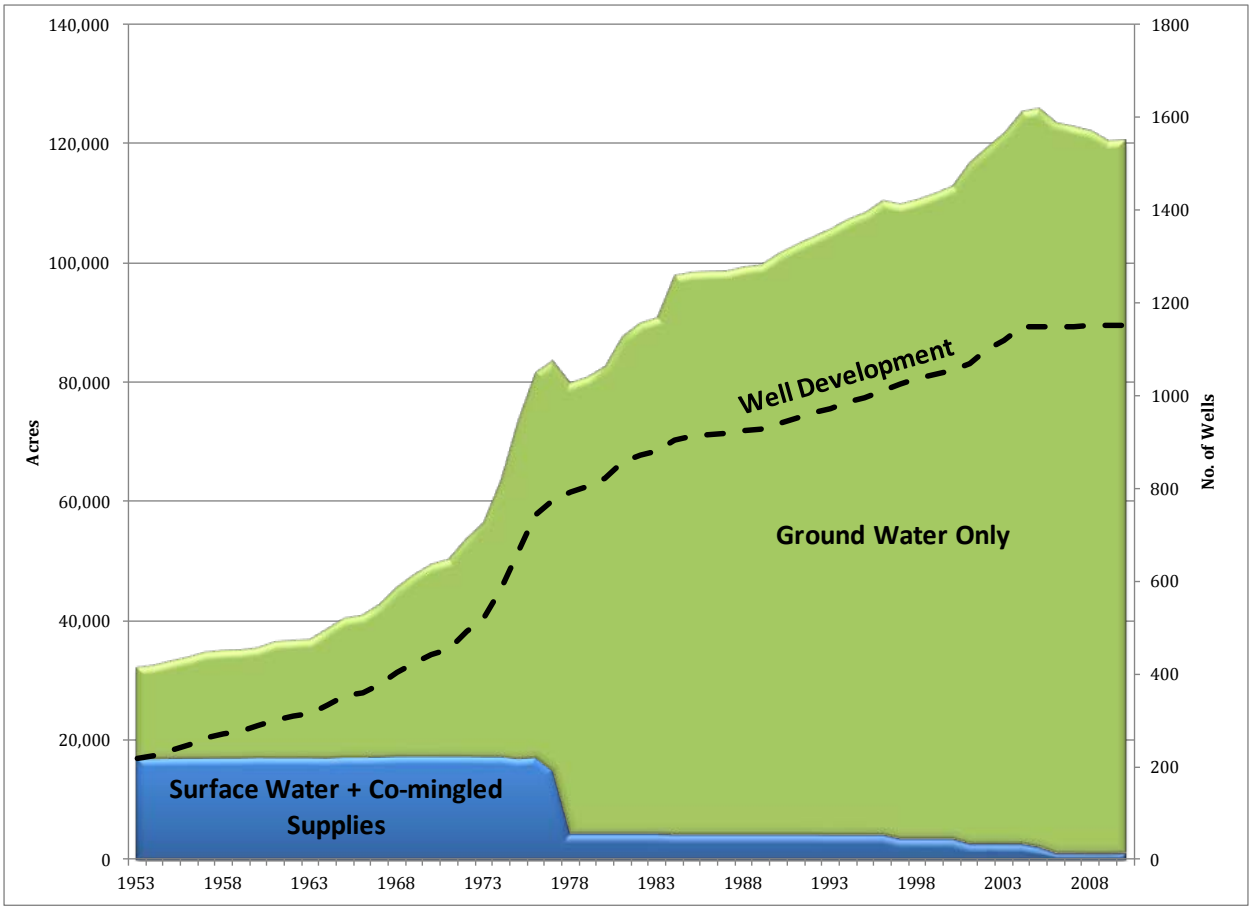

Figure 10: SPNRD Irrigated Acreage by Water Supply & Well Development

Table 17 reflects the detailed assessment year acreage totals for each major surface water irrigation district and the Pumpkin Creek area in the NPNRD by water supply. As reflected in the table and in **Figure 9**, the total acreage served by each irrigation districts has remained relatively constant over the study period; however the acreage served by co-mingled supplies has continued to increase over time. **Table 18** reflects the detailed assessment for the SPNRD, summarized by subarea and water supply. As shown in the table, after 1997, all irrigated acreage is certified to receive ground water supplies.

Table 17: NPNRD Detailed Assessment Year Irrigated Acreage Summary

Irrigation District	1953		1975		1984		1993		1997		2001		2005		2010	
	SW Only	Co-Mingled	SW Only	Co-Mingled	SW Only	Co-Mingled	SW Only	Co-Mingled	SW Only	Co-Mingled	SW Only	Co-Mingled	SW Only	Co-Mingled	SW Only	Co-Mingled
Alliance	5,661	251	4,808	745	4,595	817	3,535	1,551	3,333	1,717	3,172	1,850	2,700	2,252	2,669	2,216
Beerline	2,266	26	1,578	223	863	433	904	587	259	631	302	560	304	612	247	535
Belmont/Bridgeport*	8,520	524	4,466	3,321	2,957	3,723	2,507	4,054	2,400	4,118	2,237	4,333	1,888	4,477	2,237	4,410
Blue Creek	2,441	368	1,798	965	1,545	1,284	1,161	1,651	1,198	1,677	922	1,915	911	1,872	774	1,979
Browns Creek	4,527	179	3,740	526	3,131	856	3,326	997	3,224	1,032	3,239	1,049	3,003	1,551	2,529	1,483
Castle Rock	5,235	145	4,780	510	4,655	870	4,629	1,053	4,550	1,160	4,326	1,447	4,155	1,555	4,213	1,426
Central	1,911	21	1,648	113	1,643	97	1,071	730	1,026	729	922	826	795	894	890	898
Chimney Rock	4,839	305	4,791	270	4,642	467	4,507	486	4,464	337	4,281	337	4,283	337	4,367	337
Empire	2,181	237	2,243	81	2,053	39	2,007	39	1,559	534	1,560	534	1,377	534	1,377	538
Enterprise	5,501	996	4,594	1,342	3,671	1,429	3,656	1,455	3,312	1,503	3,151	1,496	2,907	1,506	2,968	1,464
Farmers**	49,126	3,812	37,741	13,612	35,340	17,168	27,650	25,139	26,452	26,219	25,538	26,854	21,281	30,999	21,088	30,954
Gering	12,364	74	11,352	535	10,311	1,234	9,644	2,002	9,242	2,245	9,135	2,231	8,818	2,231	8,840	2,304
Gering-Fort Laramie	53,560	208	52,438	1,346	52,741	1,393	52,812	1,776	52,734	1,937	52,809	1,934	52,512	2,113	52,540	2,131
Graf	1,308	768	880	1,046	679	984	595	1,086	513	1,046	737	1,054	744	1,097	623	1,054
Hooper	544	-	117	396	101	415	96	417	110	417	142	434	142	434	106	429
Lisco	2,702	133	1,941	677	1,837	712	1,593	817	1,609	823	1,533	973	993	1,267	958	1,258
Midland-Overland	1,672	-	1,127	187	1,290	281	1,006	518	1,090	515	1,191	498	1,156	532	822	531
Minatare	7,395	138	6,053	755	6,082	750	4,892	1,598	4,326	1,898	4,422	1,873	4,265	2,120	4,627	2,114
Mitchell	8,628	4,641	6,111	7,224	6,155	7,165	5,886	7,959	5,412	7,963	5,212	7,949	5,217	7,922	5,475	7,861
Ninemile	4,436	208	3,705	879	3,665	949	3,269	1,182	3,215	1,197	2,993	1,429	3,005	1,411	2,748	1,674
Northport	13,901	168	13,445	317	13,830	524	13,610	1,064	13,070	1,654	13,049	1,707	9,559	4,416	8,977	4,453
Paisley	889	116	62	796	26	797	12	801	32	792	102	785	103	655	51	682
Pathfinder	87,694	7,857	74,106	18,839	70,410	23,430	63,810	30,136	63,367	31,141	61,920	31,986	53,358	37,744	53,928	38,302
Shortline	2,522	62	2,322	196	2,261	285	2,098	416	2,099	415	2,097	421	2,118	405	2,397	433
Union	735	-	452	284	407	271	481	306	482	309	504	309	408	405	322	436
Winters Creek	3,790	373	3,299	938	3,070	1,064	2,803	1,200	2,692	1,198	2,377	1,371	2,257	1,393	2,301	1,394
Acreage Subtotal	**294,348**	**21,612**	**249,596**	**56,122**	**237,958**	**67,437**	**217,557**	**89,020**	**211,770**	**93,208**	**207,873**	**96,155**	**188,257**	**110,737**	**188,076**	**111,297**
Ground Water Only Acreage		8,189		55,194		120,314		128,769		136,156		141,124		141,698		135,235
Pumpkin Creek SW Only Acreage		5,299		2,380		670		498		413		352		348		741
Pumpkin Creek Co-Mingled Acreage		926		4,067		2,865		3,013		3,116		3,192		3,179		2,854
NPNRD Total Acreage		**330,374**		**367,359**		**429,244**		**438,857**		**444,664**		**448,696**		**444,218**		**438,203**
Total Certified Acreage		**30,727**		**115,383**		**190,616**		**220,802**		**232,481**		**240,472**		**255,613**		**249,386**

* Belmont total excludes Meredith Ammer Canal acreage
** Farmers Irrigation District includes historical Ramshorn district acreage

Table 18: SPNRD Detailed Assessment Year Irrigated Acreage Summary

Water Source	Subarea	1953	1975	1984	1993	1997	2001	2005	2010
GW Only	Lodgepole Creek	12,337	29,886	37,546	37,968	38,160	39,693	39,318	36,283
	South Platte Valley	2,270	4,269	5,363	5,735	6,197	6,948	7,329	7,900
	Tablelands	819	34,624	50,583	57,639	61,774	67,287	76,877	75,093
	Subtotal	15,425	68,779	93,492	101,342	106,130	113,927	123,524	119,276
Comingled	Lodgepole Creek	2,973	4,755	0	0	0	0	0	0
	South Platte Valley (Western)	2,887	3,941	4,098	4,145	3,506	2,669	2,116	1,116
	Subtotal	5,860	8,697	4,098	4,145	3,506	2,669	2,116	1,116
Surface Water Only	Lodgepole Creek	9,248	5,634	0	0	0	0	0	0
	South Platte Valley (Western)	1,626	370	104	14	0	0	0	0
	Subtotal	10,875	6,004	104	14	0	0	0	0
SPNRD Total Irrigated Acreage		**32,160**	**83,480**	**97,694**	**105,501**	**109,636**	**116,596**	**125,640**	**120,392**

Irrigated Acreage by Crop Type

As discussed above and in **Appendix C**, crop information from multiple sources was used to assign crop types to acreage over time. Historically, tabular cropping information from County Agricultural Statistics and information from the Dr. Martin report was used; COHYST/CALMIT data was used to assign cropping information from 1993 to 2005; and NPNRD cropping data supplemented with CropScape was used in 2006 and 2010.

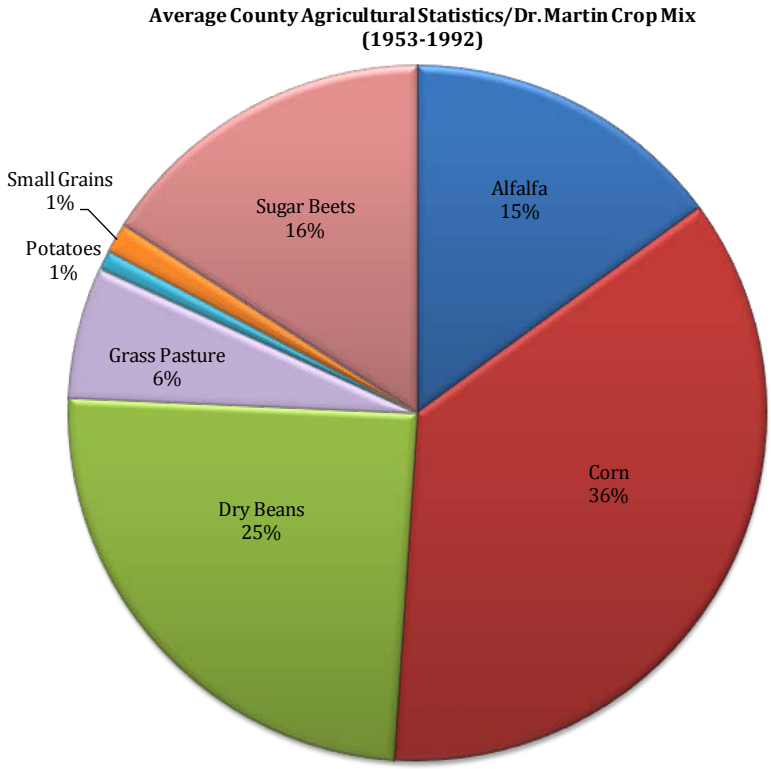

Figure 11 shows the average cropping pattern, as a percentage of total acreage, for the three periods. Consistent crops throughout the entire study period are alfalfa, corn, and dry beans. Sugar beets represented a much larger percentage historically, but in recent years has decreased reflecting local sugar beet facility closures.

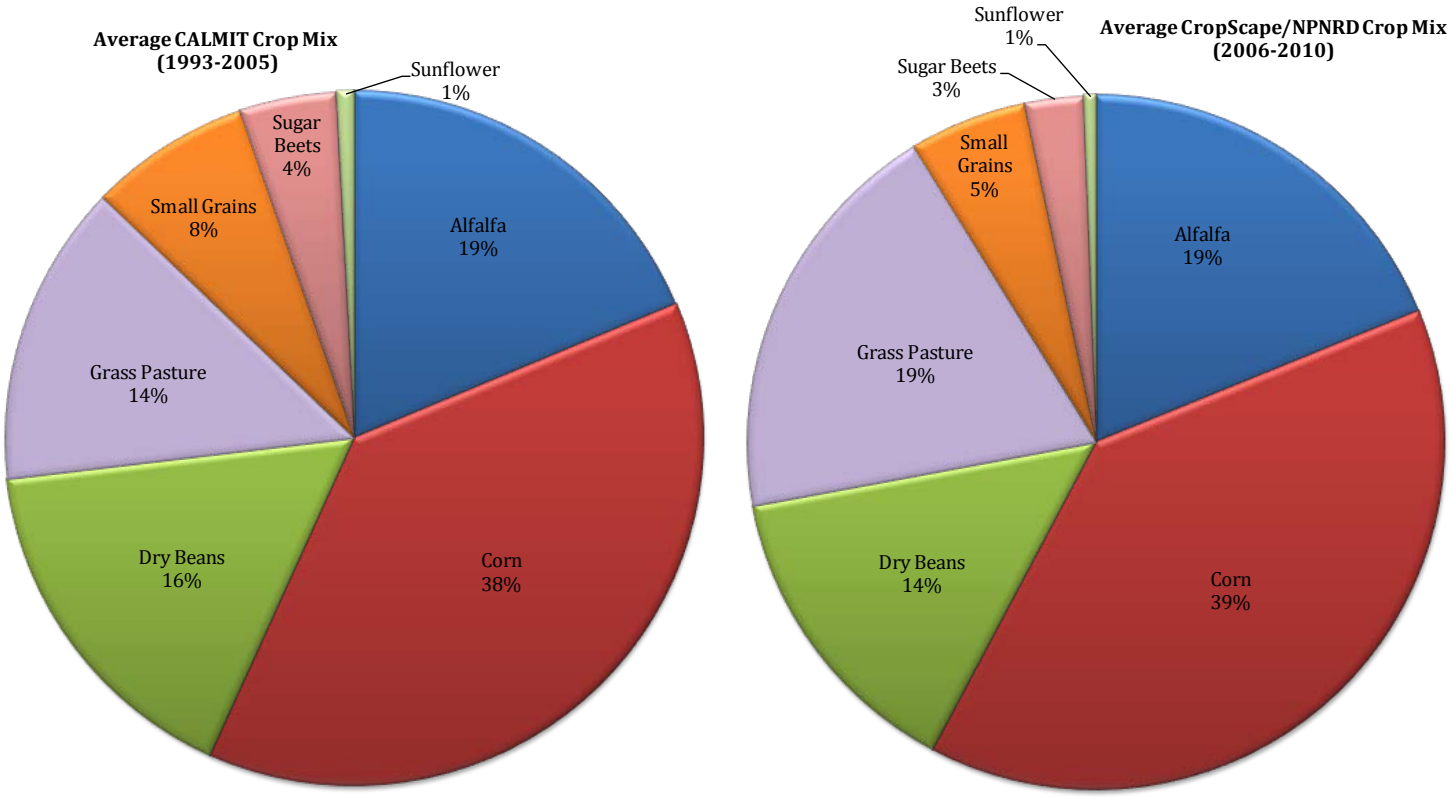

Figure 11: Average NPNRD Crop Pattern

A similar graphical comparison can be made for the SPNRD. In the SPNRD, crop information from County Agricultural Statistics, COHYST/CALMIT, CropScape and NRD cropping data was used to develop crop assignments. **Figure 12** shows the average cropping pattern, as a percentage of total acreage, using these sources in the SPNRD area.

Recently, corn and small grains are generally the dominant crop types whereas historically dry beans held a larger percentage. Note that historically grass pasture was not represented in the crop mix. Analysis of County Agricultural Statistics compared to COHYST/CALMIT showed differences between the classification of grass pasture and alfalfa crops. This difference in classification is represented by the reduction in alfalfa and increase in grass pasture percentages more recently.

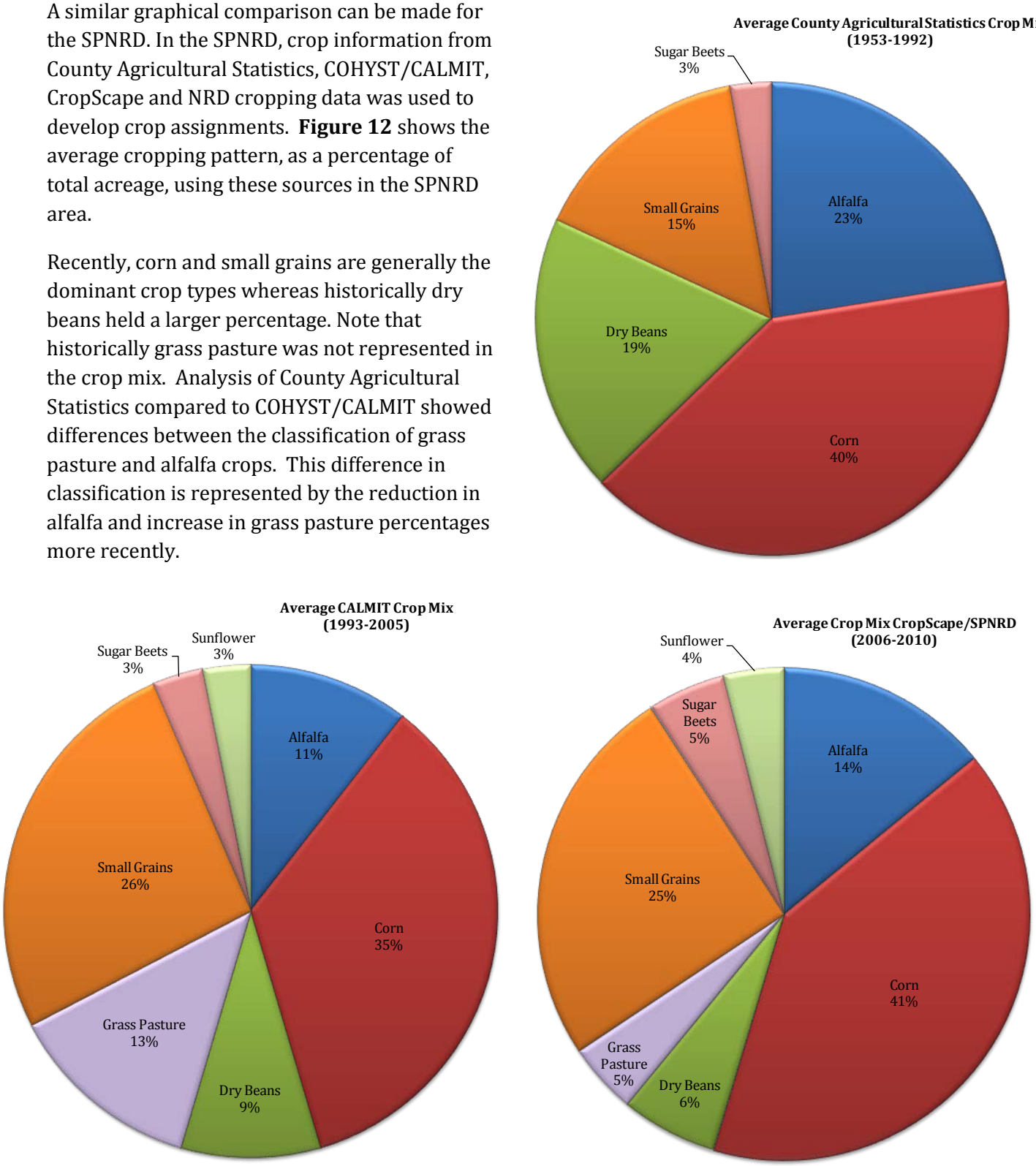

Figure 12: Average SPNRD Crop Pattern

Irrigated Acreage by Irrigation Application Method

As expected, the conversion from flood irrigation to irrigation via sprinklers/pivots in the North Platte and South Platte NRD areas has been significant. As shown in **Figure 13**, lands under flood irrigation remained relatively static until the mid-1990's in the NPNRD, while new acreage put into production used sprinkler irrigation. The conversion of historically flood irrigated lands over to sprinklers began to take place during the late-1990's as evidenced by the sharp decrease in flood irrigated land during that time. In addition, the development of sprinkler irrigated lands outside of the North Platte River corridor has increased significantly since 1984. As of 2010, approximately 50 percent of the irrigated land in the NPNRD remains flood irrigated.

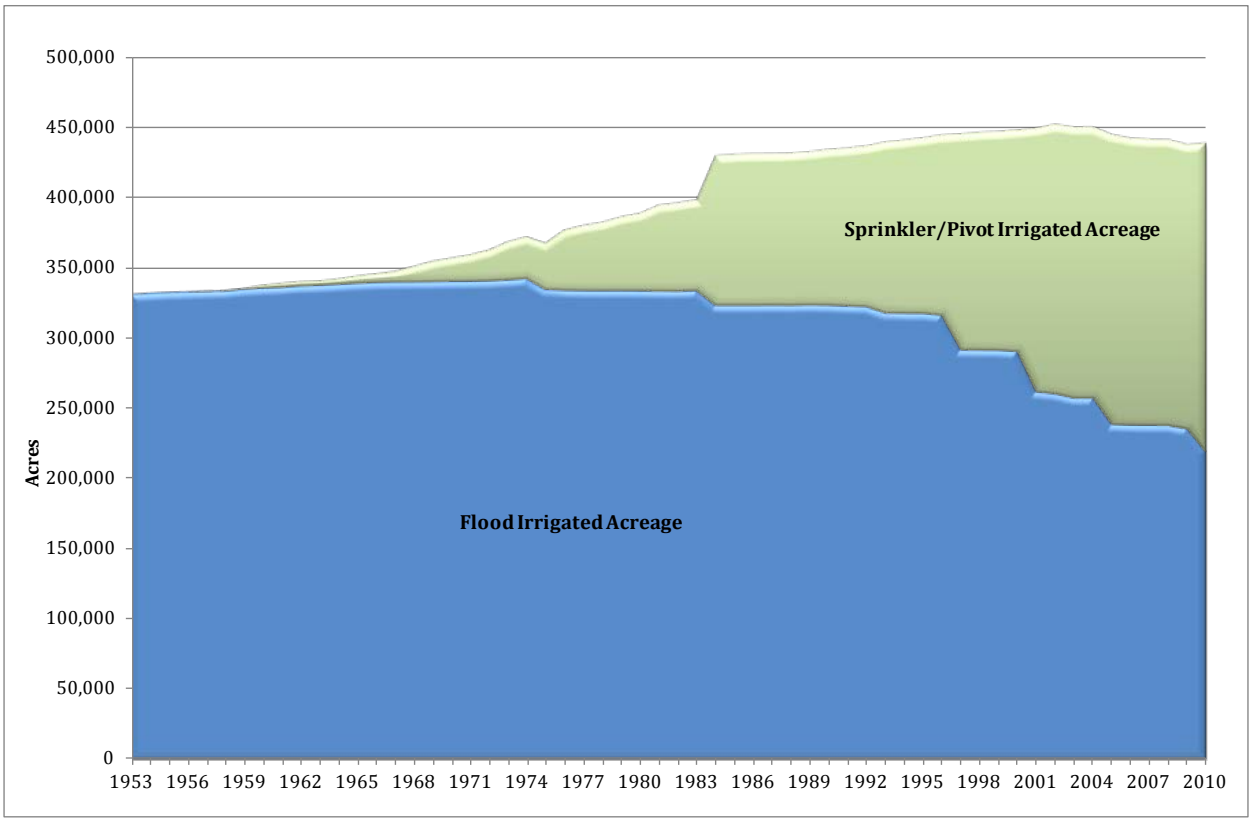

Figure 13: NPNRD Flood vs. Sprinkler Acreage

As shown in **Figure 14**, a similar trend occurred to lands in the SPNRD area. The amount of converted acreage, however was much greater in the SPNRD due to the limited water availability in Lodgepole Creek for surface water diversions after the mid-1970's. A majority of the flood irrigated parcels in the SPNRD are served by Western Ditch with diversions from the South Platte River. As of 2010, less than 10 percent of the irrigated land in the SPNRD remains flood irrigated.

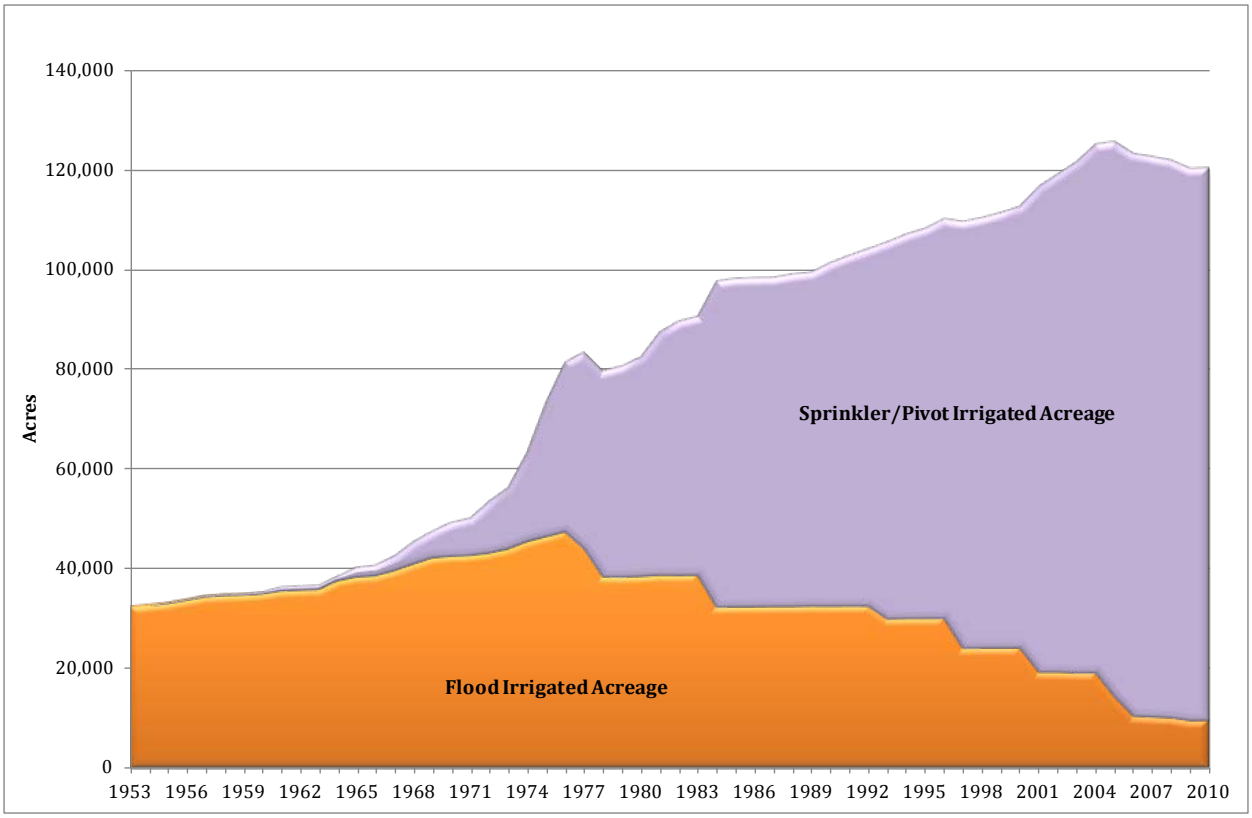

Figure 14: SPNRD Flood vs. Sprinkler Acreage

Irrigated Acreage by County and Subarea

Much of the irrigated acreage in the NPNRD area occurs in Scotts Bluff county, with approximately 42 percent of the entire county area covered with irrigated land in 2010. **Figure 15** reflects the average distribution of irrigated acreage in the NPNRD counties.

In the SPNRD area, approximately half of the irrigated land is located in Cheyenne county with the remaining 32 percent in Kimball county and 18 percent in Deuel county in 2010. Maximum, minimum and average irrigated acreage by subareas, referenced frequently in the SPNRD, is shown in **Table 19**. See **Table 13** for subareas in the SPNRD; subareas FA-C, FA-D, and FA-K are summarized below by *Tablelands*,

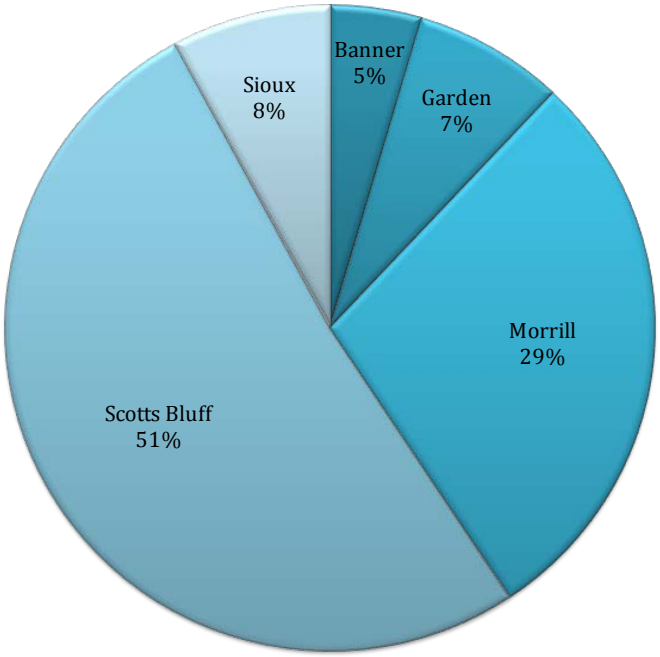

Figure 15: Average (1953-2010) Distribution of NPNRD Irrigated Acreage by County

SPV is represented below by *South Platte Valley*, and the remaining subareas are represented below by *Lodgepole Creek*.

Table 19: SPNRD Irrigated Acreage by Subarea

	Lodgepole Creek	South Platte Valley	Tablelands	Total
1953 – 2010 Average	34,394	8,780	37,015	80,189
Percent of Average Total	43%	11%	46%	100%
Minimum (1953)	24,558	6,783	819	32,160
Maximum (2005)	39,318	9,445	76,877	125,640
Current (2010)	36,283	9,016	75,093	120,392

DRYLAND ACREAGE SUMMARIES

Summaries of dryland acreage in each NRD provide a picture of the steady decline in dryland acreage over time, as the acreage is converted to irrigated land. Understanding this change, coupled with an understanding of irrigated acreage increases, provides insight into how consumptive use and recharge in the NRD areas has changed over the study period. In general, the following tables and graphics summarize the total dryland acreage by county, by crop type and in relation to irrigated acreage in the NRD areas.

Dryland Acreage Totals by County

The largest areas of dryland acreage in the NPNRD are located in the southern-most portion of the NRD area, near the boundary with the SPNRD. More than 65 percent of the dryland acreage in the NPNRD area is located in Banner and Garden counties, with the smallest amount of dryland acreage located in Sioux county. **Table 20** summarizes the average, maximum, and minimum dryland acreage in the NPNRD by county. In general, there has been a steady decline in dryland acreage over the study period, approximately 36 percent between 1953 and 2005. In recent years, due in part to programs such as CREP and EQIP, there has been a slight increase in dryland acreage in the area. In general, both the North Platte and South Platte NRD experienced an increase to dryland acreage from 2005 to 2010 in part, as a result of CRP lands becoming active again and increased commodity prices for wheat.

Table 20: NPNRD Dryland Acreage County Distribution

	Banner	Garden	Morrill	Scotts Bluff	Sioux	Total
1953 – 2010 Average	167,501	131,979	92,397	38,687	7,225	437,789
Percent of Average Total	38%	30%	21%	9%	2%	100%
Maximum (1953)	191,270	155,474	120,700	42,718	12,013	522,175
Minimum (2005)	128,885	109,557	56,929	33,999	1,724	331,094
Current (2010)	143,150	113,028	65,471	36,246	2,239	360,134

There is a significant amount of dryland acreage in the SPNRD. Of the 1,656,960 available acres in the three counties, an average of 60 percent of the land has been covered by dryland acreage over the study period. **Table 21**, summarizes the average, maximum, and minimum dryland acreage in the SPNRD by county. SPNRD has experienced an approximate 14 percent decline in dryland acreage over the 1953 to 2005 period. The decline in acreage in each county was fairly steady with the exception of Kimball County, which saw a sharp decline in early 1990's as the result of ground water development of the Tablelands and the reduction of dryland farming practices.

Table 21: SPNRD Dryland Acreage County Distribution

	Cheyenne	Deuel	Kimball	Total
1953 – 2010 Average	481,955	182,317	339,595	1,003,867
Percent of Average Total	48%	18%	34%	100%
Maximum (1953)	505,644	186,242	359,561	1,051,447
Minimum (2005)	438,575	177,703	288,671	904,949
Current (2010)	448,432	181,249	294,762	924,443

Dryland Acreage Totals by Crop Type

As discussed above and in **Appendix C**, the dryland crops were assigned using information from COHYST/CALMIT, CropScape, and County Agricultural Statistics. Summer fallow, although not a crop, was assigned to lands identified as fallowed in both NRD areas because of its impact to precipitation recharge in the modeling effort. An average of 44 percent of dryland was fallowed in the NPNRD, and 47 percent in the SPNRD.

Aside from fallowed lands, small grains is the dominant dryland crop type in both the North Platte and South Platte NRDs. As shown in **Figures 16** and **17** of the dryland acreage for the NRD areas, the sources of crop information used differing techniques to classify fallowed lands and grass pasture. The County Agricultural Statistics appear to classify grass pasture lands as either alfalfa or fallow lands when compared to the classification of COHYST/CALMIT and CropScape. This difference in classification results in the decrease of fallow lands and increase in grass pasture lands post 1993.

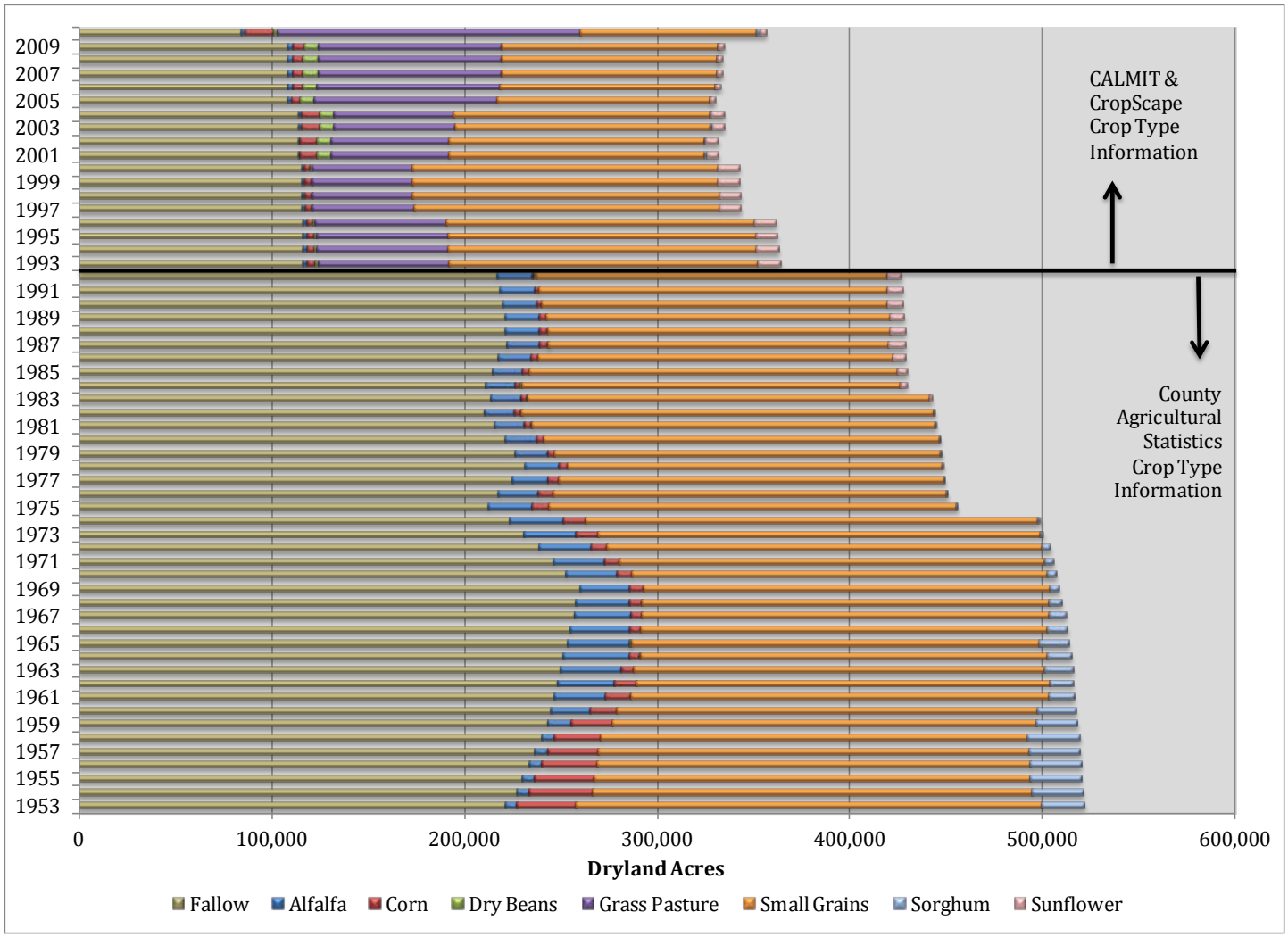

Figure 16: NPNRD Dryland Acreage by Crop

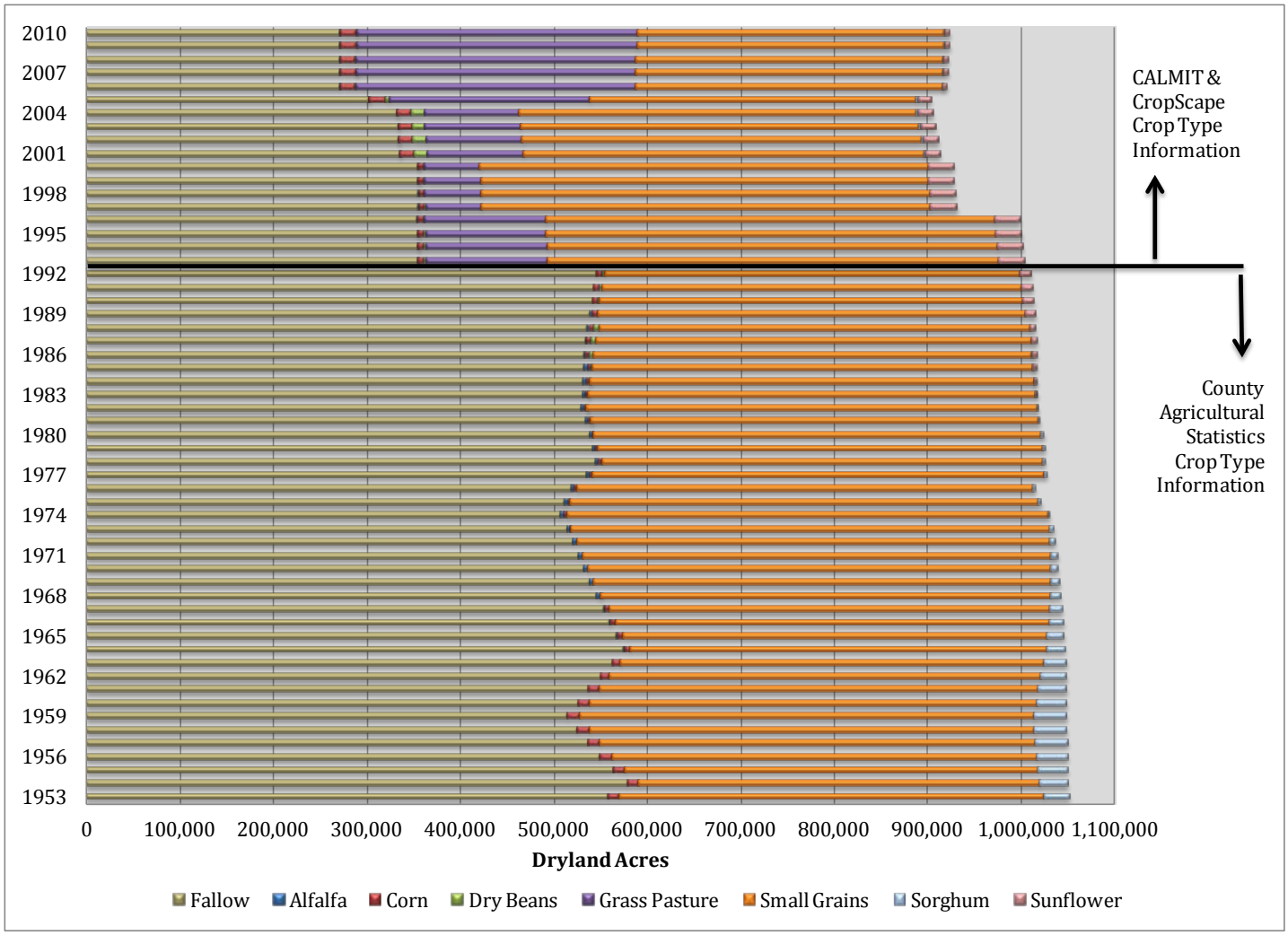

Figure 17: SPNRD Dryland Acreage by Crop

Dryland Acreage Compared to Irrigated Acreage

It is important to visualize the trends of irrigated and dryland acreage over time and assess how the changes have impacted the NRDs both in terms of consumptive use, depletions and irrigation recharge, but also the economics and farming industry in the areas. **Figures 18** and **19** show the total dryland and irrigated acreage in North Platte and South Platte NRD areas, respectively. Note that there is a close ratio between irrigated and dryland acreage in the NPNRD, however the ratio of dryland acres to irrigated acres in the SPNRD area required dual axis (e.g. left axis represents dryland acreage values) for representation of the trends. The trends in both NRDs support an overall change in the farming dynamic in the late-1980's whereby a shift from dryland acreage to irrigated acreage had taken place. From 1953 to 1990, total dryland acreage in the NPNRD had dropped by approximately 94,000 acres and total irrigated acreage had increased by approximately

103,000 acres. In the SPNRD over the same period, dryland acreage had dropped by approximately 37,000 acres and irrigated acreage had increased by 69,000 acres.

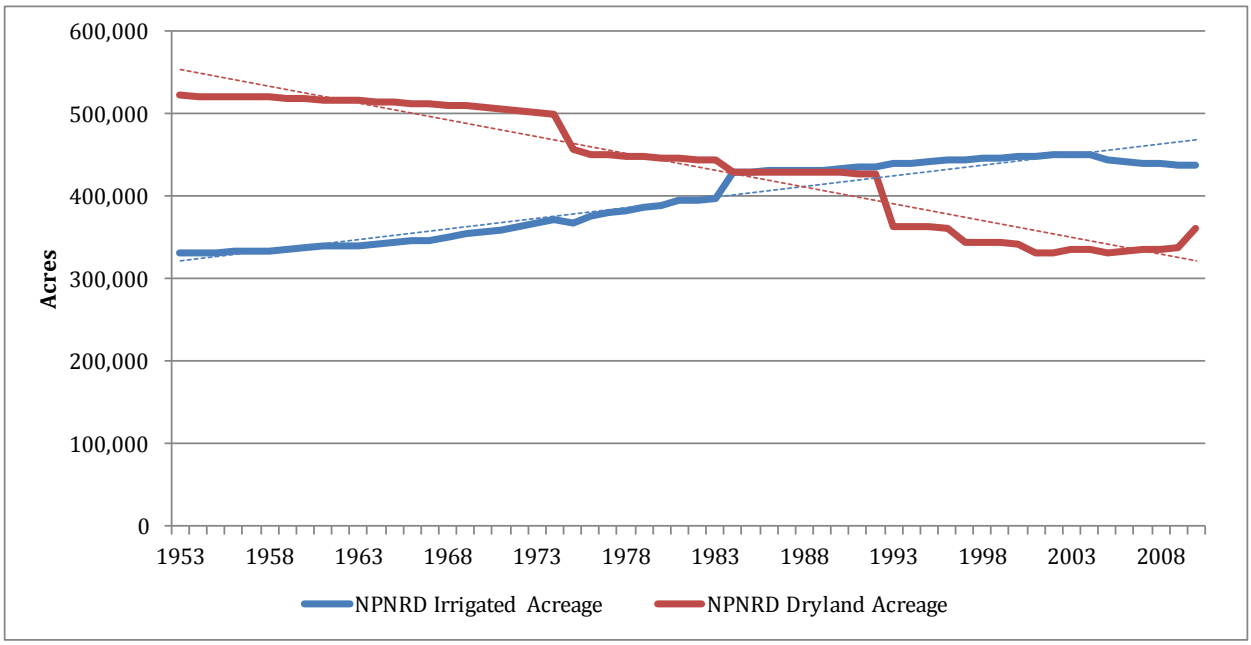

Figure 18: NPNRD Irrigated and Dryland Acreage Trends

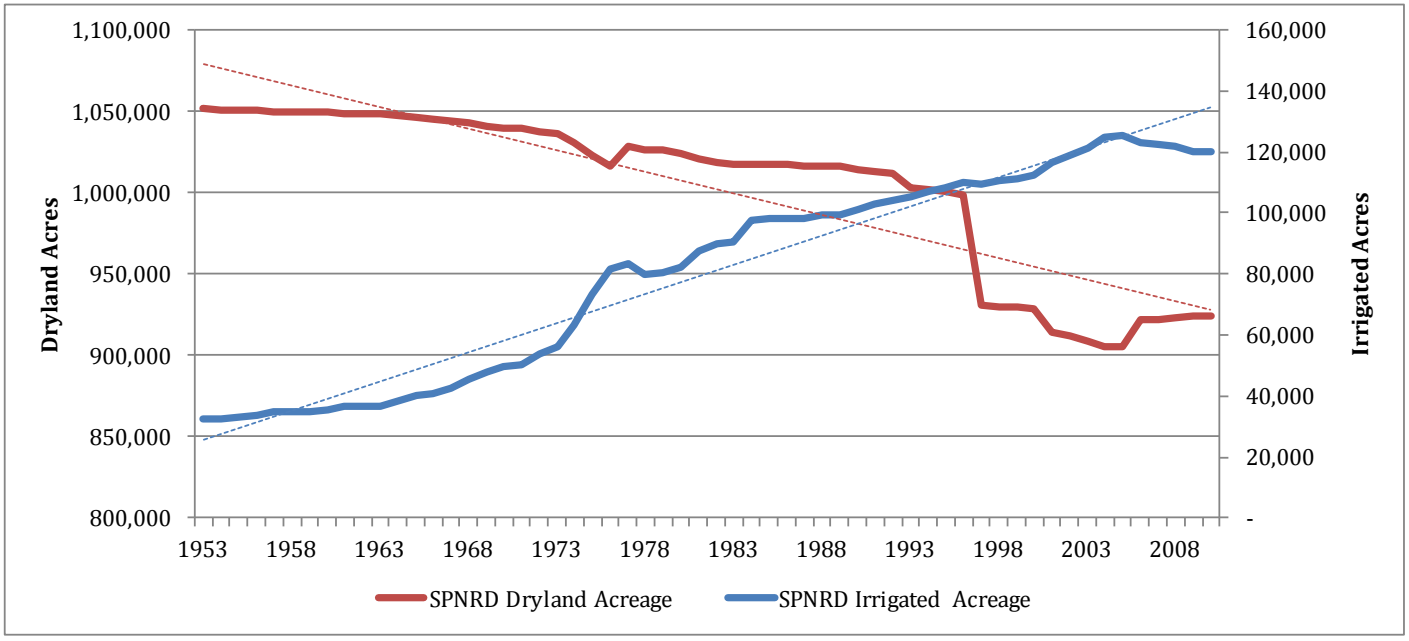

Figure 19: SPNRD Irrigated and Dryland Acreage Trends

A visual assessment of the acreage shapefiles is necessary to determine which dryland areas have been converted to irrigated lands over time. In general however, a majority of this conversion in

the NPNRD area has taken place in the southern portions of Banner and Garden counties, and in the Tableland areas, specifically the northern portions of Kimball and Cheyenne counties, in the SPNRD. **Figure 20** illustrates the dryland acreage delineated in 1953 compared to the irrigated acreage delineated in 2005 in the northern portion of Cheyenne county.

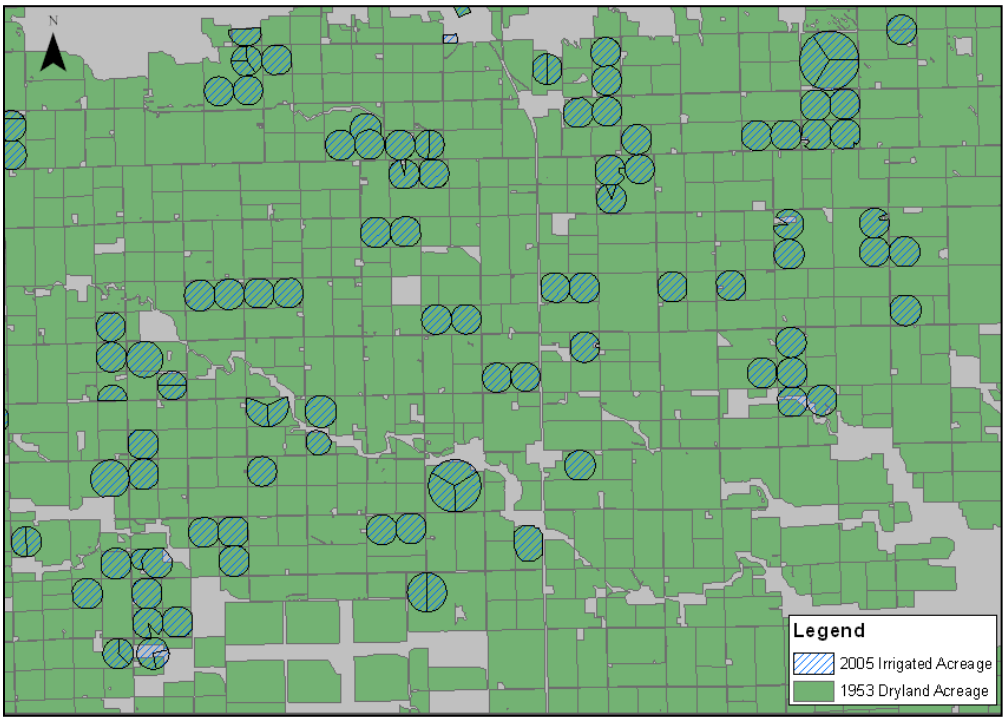

Figure 20: Cheyenne County Example of Dryland to Irrigated Acreages

ACREAGE COMPARISONS

Following the completion of the acreage assessment, it is important to compare the results to other publically available sources of acreage information.

These sources include:

1. U.S. Bureau of Reclamation (USBR) – Annual acreage totals by district for the 1946 through 2005 period, provided in the *npdiv-del.xls* spreadsheet. Information available for districts that receive USBR Project water.

2. North Platte River Return Flow Model (NPRRFM) – Annual acreage totals by district every five years for the 1977 through 1995 period, provided in the model documentation in Table 5.3. Modeled acreage is based on acreage information from the USBR and Dr. Martin Report, as well as from Nebraska DNR interviews. Information not available for districts served from Blue Creek.

3. *Post-Decree Changes in the Water Supply and Irrigation Development in the North Platte River Valley from Whalen, Wyoming to Lewellen, Nebraska* (Dr. Martin Report, USBR or NDWR) – Annual acreage totals by district for the 1946 through 1994 period, provided in the Supporting Tables of the report developed by Dr. Darrel Martin in February, 2000. Information based on USBR Crop Census Reports and Nebraska DWR Annual Reports.

4. *COHYST Acreage Summaries* (COHYST) – 1950 through 2005 annual acreage totals by surface water district, provided in GIS shapefile format by Duane Woodward.

5. *Nebraska DNR Canal Survey* (DNR Canal Survey) – user supplied information collected for 2009 by the Nebraska DNR regarding acreage, farming practices and conveyance structures. Supplied by Pat Goltl of the DNR Bridgeport Field Office.

6. *Analysis of Depletions to the North Platte River* (Lytle Report) – 1950 through 2004 average annual acreage totals by district, provided in Table C-5 of the report developed by Lytle Water Solutions, LLC in June, 2009. Information based on USBR and COHYST irrigated acreage summaries.

7. Verbal Communication from Tom Hayden (Tom Hayden) – Acreage totals by district generally based on the total surface water rights available to the district.

8. *Estimated Stream Baseflow Depletion by Natural Resources District in the Nebraska Platte Basin due to Gained and Lost Groundwater Irrigated Land after July 1, 1997* (Luckey Report) – Total and net gained/lost groundwater irrigated land for the period of July 1, 1997 through June 30, 2005 developed by Richard Luckey of High Plains Hydrology, LLC in June, 2008. Acreage information summarized by county, including both NRDs, from Table 1 for 1997, 2001 and 2005.

Comparisons of annual acreage totals were made when the data was available (i.e. USBR, NPRRFM, COHYST, DNR Canal Survey and the Dr. Martin Report) and provided in **Tables 22** through **29**. Often, acreage information for the Blue Creek irrigation districts were not available from the comparison sources, therefore subtotals with and without the Blue Creek irrigation districts have been provided in the tables. If the exact year was not available, the nearest representative year was included for comparison purposes. Averages of ditch-wide totals available from the Lytle Report and Tom Hayden were made when annual information was not available. This ditch-wide average comparison is provided in **Table 30**.

The irrigation district totals summarized for comparison purposes include lands that are served by surface water only and by both surface and ground water supplies (co-mingled). District totals do not include lands that are located in the district service areas but are served only by ground water only or are dryland. The comparisons generally do not include irrigated lands in the Pumpkin Creek basin or the SPNRD, primarily because comparison sources of acreage in this basin are limited.

The comparison of the WWUM Model ground water only acreage to the information provided in the Luckey Report is presented **Appendix E.** Due to the difference in approaches, **Appendix E** strives to develop a common approach to quantifying the change in ground water acreage over the 1997 to 2005 period using the WWUM Model acreage and the COHYST acreage.

Table 22: 1953 Acreage Comparison

Irrigation District	WWUM Model (1953)	USBR (1953)	Dr. Martin (1959)	COHYST (1953)
Alliance	5,912		98	2,020
Beerline	2,292	1,003	2,080	369
Belmont/Bridgeport*	9,044	8,500	14,354	8,144
Blue Creek	2,810		2,888	2,048
Browns Creek	4,706	6,054	6,251	3,436
Castle Rock	5,380		6,538	4,319
Central	1,932	2,120	2,127	1,121
Chimney Rock	5,144	4,836	5,188	1,857
Empire	2,418		1,624	1
Enterprise	6,498	6,350	7,572	2,881
Farmers**	52,938	63,324	61,350	45,522
Gering	12,438	14,254	14,310	9,936
Gering-Fort Laramie	53,769	52,980	55,018	41,683
Graf	2,076			693
Hooper	544			266
Lisco	2,835		3,882	1,491
Midland-Overland	1,672		2,104	545
Minatare	7,533		9,508	3,552
Mitchell	13,269	13,069	13,633	9,788
Ninemile	4,644			1,623
Northport	14,069	12,466	16,109	12,196
Paisley	1,005			265
Pathfinder	95,551	87,706	111,855	74,779
Shortline	2,584		2,770	609
Union	735			182
Winters Creek	4,163		5,748	2,812
Total for USBR Project Districts	**271,648**	**272,662**	**309,847**	**211,712**
Total Excluding Blue Creek Districts	**308,789**		**342,119**	**228,686**
Total	**315,960**	**272,662**	**345,007**	**232,139**

* Belmont/Bridgeport does not include Meredith Ammer Canal (~470 Acres)
** Farmers includes Ramshorn

Table 23: 1975 Acreage Comparison

Irrigation District	WWUM Model (1975)	USBR (1975)	Dr. Martin (1975)	NPRRFM (1977)	COHYST (1975)
Alliance	5,553		98	6,146	2,015
Beerline	1,801	970	2,080	988	374
Belmont/Bridgeport*	7,786	8,500	14,559	8,500	8,167
Blue Creek	2,764		2,834		2,048
Browns Creek	4,266	5,604	6,289	4,054	3,425
Castle Rock	5,290		6,482	6,507	4,344
Central	1,760	1,717	2,092	1,700	1,118
Chimney Rock	5,061	4,973	5,269	5,172	1,859
Empire	2,324		2,191	2,191	519
Enterprise	5,936	7,164	7,533	7,025	2,886
Farmers**	51,353	62,126	61,413	62,062	45,537
Gering	11,886	12,707	13,501	12,515	9,913
Gering-Fort Laramie	53,784	52,899	55,018	53,188	41,683
Graf	1,926				693
Hooper	513				266
Lisco	2,617		4,208	4,058	1,491
Midland-Overland	1,314		2,104	2,104	545
Minatare	6,808		9,481	9,481	3,552
Mitchell	13,335	12,968	13,564	12,392	9,788
Ninemile	4,584		5,978	5,978	1,617
Northport	13,762	14,048	16,111	13,954	12,197
Paisley	859				265
Pathfinder	92,945	96,549	111,699	96,549	74,769
Shortline	2,518		2,786	2,900	613
Union	736				182
Winters Creek	4,237		5,748	5,748	2,815
Total for USBR Project Districts	**263,676**	**280,225**	**309,128**	**278,099**	**211,716**
Total Excluding Blue Creek Districts	**298,921**		**348,204**		**229,228**
Total	**305,719**	**280,225**	**351,038**	**323,212**	**232,681**

* Belmont/Bridgeport does not include Meredith Ammer Canal (~415 Acres)
** Farmers includes Ramshorn

Table 24: 1984 Acreage Comparison

Irrigation District	WWUM Model (1984)	USBR (1984)	Dr. Martin (1984)	NPRRFM (1985)	COHYST (1984)
Alliance	5,411		97	6,146	2,009
Beerline	1,295	928	2,080	928	378
Belmont/Bridgeport*	6,680	8,190	8,912	8,880	8,146
Blue Creek	2,829		2,834		2,048
Browns Creek	3,988	4,585	6,286	4,585	3,419
Castle Rock	5,525		6,463	6,441	4,322
Central	1,740	1,450	1,984	1,450	1,118
Chimney Rock	5,108	5,172	5,269	5,172	1,857
Empire	2,092		2,191	2,191	516
Enterprise	5,100	7,384	7,813	7,362	2,871
Farmers	52,508	60,179	62,632	60,179	45,541
Gering	11,545	10,959	12,270	11,864	9,937
Gering-Fort Laramie	54,133	52,614	54,993	52,885	41,683
Graf	1,663				693
Hooper	516				266
Lisco	2,548		4,170	4,170	1,491
Midland-Overland	1,571		2,104	2,104	545
Minatare	6,832		9,321	9,321	3,553
Mitchell	13,320	10,799	13,600	10,040	9,788
Ninemile	4,614		6,078	6,078	1,638
Northport	14,354	14,365	16,177	14,882	12,196
Paisley	823				265
Pathfinder	93,840	96,493	111,699	95,751	74,769
Shortline	2,547		2,752	2,900	616
Union	678				182
Winters Creek	4,134		5,585	5,745	2,811
Total for USBR Project Districts	**263,612**	**273,118**	**303,715**	**273,978**	**211,704**
Total Excluding Blue Creek Districts	**298,886**		**342,476**		**229,204**
Total	**305,395**	**273,118**	**345,310**	**319,074**	**232,658**

* Belmont/Bridgeport does not include Meredith Ammer Canal (~370 Acres)

Table 25: 1993 Acreage Comparison

Irrigation District	WWUM Model (1993)	USBR (1993)	Dr. Martin (1993)	NPRRFM (1990)	COHYST (1993)
Alliance	5,087		6,262	7,616	2,017
Beerline	1,491	494	993	803	379
Belmont/Bridgeport*	6,561	2,920	6,315	3,133	2,960
Blue Creek	2,811		2,688		2,048
Browns Creek	4,322	5,508	2,117	4,072	3,428
Castle Rock	5,682		6,244	5,983	4,329
Central	1,800	1,791	1,984	2,053	1,111
Chimney Rock	4,993	5,373	5,269	5,481	1,858
Empire	2,046		2,182	2,075	516
Enterprise	5,112	5,063	7,702	7,362	2,884
Farmers	52,789	58,993	63,283	48,762	45,537
Gering	11,645	10,399	12,241	11,208	9,936
Gering-Fort Laramie	54,588	52,466	54,642	50,754	41,683
Graf	1,681				693
Hooper	512				266
Lisco	2,410		2,626	4,067	1,491
Midland-Overland	1,524		1,624	2,104	545
Minatare	6,490		9,150	9,052	3,553
Mitchell	13,845	11,917	12,855	12,120	9,788
Ninemile	4,451		11,926	6,078	1,603
Northport	14,675	15,223	16,137	14,072	12,230
Paisley	813				265
Pathfinder	93,946	96,213	102,748	96,237	74,740
Shortline	2,514		2,967	2,900	612
Union	787				182
Winters Creek	4,003		4,089	5,745	2,815
Total for USBR Project Districts	**265,766**	**266,359**	**286,286**	**256,057**	**206,535**
Total Excluding Blue Creek Districts	**299,973**		**333,355**		**224,016**
Total	**306,577**	**266,359**	**336,043**	**301,677**	**227,470**

* Belmont/Bridgeport does not include Meredith Ammer Canal (~370 Acres)

Table 26: 1997 Acreage Comparison

Irrigation District	WWUM (1997)	USBR (1997)	Dr. Martin (1994)	NPRRFM (1995)	COHYST (1997)
Alliance	5,050		5,660	5,860	1,978
Beerline	891	913	993	1,070	379
Belmont/Bridgeport*	6,518	6,958	6,315	6,362	6,987
Blue Creek	2,875		2,695		2,048
Browns Creek	4,256	4,110	2,117	4,008	3,416
Castle Rock	5,710		6,244	6,244	4,331
Central	1,755	1,712	1,984	2,060	1,108
Chimney Rock	4,801	5,619	5,269	5,558	1,856
Empire	2,093		2,152	2,152	518
Enterprise	4,815	6,517	7,540	5,562	2,896
Farmers	52,671	62,127	63,283	50,057	43,935
Gering	11,487	11,214	12,287	10,553	9,937
Gering-Fort Laramie	54,671	52,648	54,642	52,487	41,683
Graf	1,559				693
Hooper	527				266
Lisco	2,433		2,626	2,626	1,491
Midland-Overland	1,606		1,624	1,624	545
Minatare	6,225		9,150	9,150	3,550
Mitchell	13,376	12,603	12,846	11,871	9,785
Ninemile	4,411		6,398	6,398	1,638
Northport	14,723	14,180	16,137	14,047	12,235
Paisley	824				265
Pathfinder	94,508	96,157	100,968	95,295	74,686
Shortline	2,514		2,967	2,900	626
Union	791				182
Winters Creek	3,890		5,851	5,851	2,815
Total for USBR Project Districts	**264,473**	**274,758**	**284,381**	**258,930**	**208,902**
Total Excluding Blue Creek Districts	**298,403**		**327,053**		**226,395**
Total	**304,979**	**274,758**	**329,748**	**301,735**	**229,848**

* Belmont/Bridgeport does not include Meredith Ammer Canal (~350 Acres)

Table 27: 2001 Acreage Comparison

Irrigation District	WWUM Model (2001)	USBR (2001)	COHYST (2001)
Alliance	5,022		2,028
Beerline	862	1,037	362
Belmont/Bridgeport*	6,570	6,908	6,929
Blue Creek	2,838		166
Browns Creek	4,287	4,110	3,429
Castle Rock	5,772		4,326
Central	1,748	1,712	1,319
Chimney Rock	4,618	5,354	1,859
Empire	2,094		516
Enterprise	4,647	6,566	2,966
Farmers	52,391	62,167	45,585
Gering	11,366	11,707	10,387
Gering-Fort Laramie	54,743	53,535	43,445
Graf	1,791		707
Hooper	576		394
Lisco	2,506		1,491
Midland-Overland	1,689		232
Minatare	6,296		3,585
Mitchell	13,162	12,801	10,210
Ninemile	4,423		1,355
Northport	14,756	15,361	12,299
Paisley	887		279
Pathfinder	93,907	96,157	78,374
Shortline	2,518		322
Union	813		158
Winters Creek	3,748		2,650
Total for USBR Project Districts	**263,057**	**277,415**	**217,162**
Total Excluding Blue Creek Districts	**297,124**		**233,666**
Total	**304,028**	**277,415**	**235,369**

* Belmont/Bridgeport does not include Meredith Ammer Canal (~300 Acres)

Table 28: 2005 Acreage Comparison

Irrigation District	WWUM Model (2005)	USBR (2005)	COHYST (2005)
Alliance	4,952		2,029
Beerline	916	1,057	371
Belmont/Bridgeport*	6,365	6,908	6,932
Blue Creek	2,783		74
Browns Creek	4,554	4,657	3,438
Castle Rock	5,709		4,279
Central	1,689	1,690	1,137
Chimney Rock	4,621	5,357	1,859
Empire	1,911		515
Enterprise	4,413	4,875	2,620
Farmers	52,280	54,840	44,126
Gering	11,048	12,965	9,909
Gering-Fort Laramie	54,625	52,096	43,442
Graf	1,841		9
Hooper	576		457
Lisco	2,260		1,491
Midland-Overland	1,688		337
Minatare	6,385		3,739
Mitchell	13,138	12,720	10,000
Ninemile	4,416		1,786
Northport	13,975	15,150	12,064
Paisley	759		582
Pathfinder	91,102	89,206	74,947
Shortline	2,523		703
Union	813		306
Winters Creek	3,650		2,773
Total for USBR Project Districts	**258,727**	**261,521**	**210,845**
Total Excluding Blue Creek Districts	**292,222**		**228,498**
Total	**298,994**	**261,521**	**229,926**

* Belmont/Bridgeport does not include Meredith Ammer Canal (~290 Acres)

Table 29: 2010 Acreage Comparison

Irrigation District	WWUM Model (2010)	DNR Canal Survey (2009)
Alliance	4,885	5,665
Beerline	782	993
Belmont/Bridgeport*	6,646	6,315
Blue Creek	2,752	6,496
Browns Creek	4,012	4,657
Castle Rock	5,639	5,847
Central	1,788	
Chimney Rock	4,704	5,732
Empire	1,916	2,182
Enterprise	4,432	7,969
Farmers	52,042	64,000
Gering	11,144	14,610
Gering-Fort Laramie	54,672	54,845
Graf	1,677	**
Hooper	535	**
Lisco	2,216	2,326
Midland-Overland	1,354	1,711
Minatare	6,741	6,715
Mitchell	13,336	13,633
Ninemile	4,422	8,281
Northport	13,430	16,110
Paisley	734	**
Pathfinder	92,231	101,000
Shortline	2,830	3,130
Union	759	**
Winters Creek	3,695	3,809
Total for USBR Project Districts	**259,220**	**289,864**
Total Excluding Blue Creek Districts	**292,916**	**329,530**
Total	**299,373**	**336,026**

* Belmont/Bridgeport does not include Meredith Ammer Canal (~290 Acres)
** Included in the DNR Canal Survey Blue Creek Total

Table 30: 1953 – 2005 Average Acreage Comparison

Irrigation District	WWUM Model	USBR	Tom Hayden Water Right Acreage	Lytle Report USBR Acreage	Lytle Report COHYST Acreage	COHYST
Alliance	5,284		5,180	6,197	2,862	2,014
Beerline	1,364	960	1,050	961	995	373
Belmont/Bridgeport*	7,075	8,098	6,310	8,108	6,223	6,895
Blue Creek	2,816		3,390	2,865	94	1,497
Browns Creek	4,340	5,250	4,603	5,227	4,035	3,427
Castle Rock	5,581		5,753	6,244	4,950	4,322
Central	1,775	1,802	1,700	1,772	1,407	1,148
Chimney Rock	4,907	5,154	5,683	5,113	2,015	1,858
Empire	2,140		2,146	2,112	728	443
Enterprise	5,217	6,761	4,969	6,834	3,795	2,858
Farmers	52,419	61,153	55,000 - 60,331	61,114	46,979	45,112
Gering	11,631	12,449	8,000 - 13,000	12,286	9,483	9,993
Gering-Fort Laramie	54,330	52,519	54,000	52,422	43,884	42,186
Graf	1,791		795	795	145	597
Hooper	538		770			312
Lisco	2,516		2,386	3,525	1,739	1,491
Midland-Overland	1,581		1,710	2,017	633	471
Minatare	6,653		6,716	9,174	4,798	3,583
Mitchell	13,349	12,576	13,510	12,588	9,472	9,878
Ninemile	4,506		5,000 - 7,124	6,098	2,884	1,609
Northport	14,331	13,873	16,100	14,105	11,211	12,202
Paisley	853		800			312
Pathfinder	93,686	93,975	91,341	94,363	75,532	75,295
Shortline	2,531		3,130	2,828	1,002	586
Union	765		1,070			196
Winters Creek	3,975		3,800	5,676	3,564	2,784
Total for USBR Project Districts	**264,423**	**274,568**	**262,266**	**274,893**	**215,031**	**211,225**
Total Excluding Hooper, Paisley, Union	**299,188**		**298,087**			**228,528**
Total	**305,950**	**274,568**	**304,912 ****	**322,424**	**238,430**	**231,442**

* Belmont/Bridgeport does not include Meredith Ammer Canal (~290 Acres)
** Based on the minimum water right amount in ranges

ACREAGE COMPARISON OBSERVATIONS

Overall, the WWUM Model acreage totals generally agree with the other source totals. Although limited to only a portion of the districts in the North Platte basin, the USBR information closely aligns with the annual totals of the WWUM Model acreages. The WWUM Model average of 264,599 acres for USBR Project Districts is only 3 percent, or approximately 10,000 acres, less than the USBR average. In addition, the WWUM Model average total of 306,068 acres is within 1200 acres of the acreage information provided by Tom Hayden. The WWUM Model assessment acreages were generally much greater than COHYST acreages, although the methods used to assess acreage between the two efforts differed greatly. Comments and/or observations on the acreage comparisons are summarized below.

- The WWUM Model acreage total generally experience a downward trend over the years due to the change from surface water to ground water only supplies. The largest drop in total acreage is seen from 1953 to 1975, which coincides with better well technologies and an increase in well development in each basin. Most likely, there were lands within the ditch service areas that were consistently unable to receive a good supply of surface water, and these lands were converted over to ground water only supplies.

- For a majority of the districts and summary years, the Dr. Martin Report appears to provide an upper estimate for district acres. Generally the Dr. Martin Report values are greater than both the WWUM Model and USBR acreage totals. When available, the Dr. Martin Report relied on USBR census acreage data, as discussed in the Section 2.1.1 of the report. The USBR acreage information used for comparisons herein (Source 3 above) appears to reflect different USBR information than that summarized in the Dr. Martin Report, as the acreage totals can differ by as much as 30,000 acres on average.

- The COHYST values, both from the Lytle Report and the COHYST summary, are significantly lower than other sources of information. Although provided for comparison purposes herein, significant differences between the WWUM Model and COHYST methodologies make a direct comparison between the two sources difficult.

- The DNR Canal Survey provides a more recent source of acreage information, which for many districts closely compares to the WWUM Model district totals.

- In the early years, disagreement between data sources occurs for Alliance, Belmont/Bridgeport, Enterprise, Farmers, and Minatare irrigation districts. By 1997, the WWUM Model acreage totals for Alliance and Belmont/Bridgeport appear to have normalized and come into agreement with the other sources. For the remaining districts that continue to show disagreement, the service area boundaries and irrigated parcels underwent additional review. Without a full understanding of the other sources' methodologies, the reasoning behind the differences cannot be fully determined. Overall,

the average WWUM Model acreage for these districts aligns with Tom Hayden's estimate based on water rights.

- The DNR Canal Survey provides a more recent source of acreage information, which for many districts closely compares to the WWUM Model district totals. The Canal Survey comparison appears to echo the previous comment, whereby Enterprise and Farmers acreage totals differ greatly. In addition, Ninemile acreage totals greatly differ. This may be caused by the inclusion of land that intermittently receives irrigation water in some years, considered to be included by the user, but not delineated in the 2010 assessment year due to lack of irrigation for that specific year.

- There are few sources of comparative information for districts served by Blue Creek. The districts that serve land on the west side of Blue Creek are in general agreement with Tom Hayden's water rights assessment. The lands on the east side, served by Hooper, Blue Creek and Graf canals, do not align as consistently. The determination of service areas for these districts was difficult due to the absence of available permit maps and the changes of the service areas over time. These areas underwent additional review, and irrigated acreage in these districts was delineated to the best ability using the available information. Future modeling efforts may cull out acreage revisions in this area.

- In some cases, available source information varies so widely, it limits the value of comparing sources at all. For example, in 1984 acreage totals for Enterprise Canal range from 2,871 to 7,813 acres with the WWUM Model acreage total of 5,100. In the same year, acreage totals for Alliance Canal range from 97 to 6,146 acres. This wide range of acreage totals supports the imagery-based analysis performed in the WWUM Model assessment and provides perspective when analyzing comparisons to other sources.

- Once a common approach was developed, as discussed in **Appendix E**, the change in ground water only acreage from 1997 to 2005 for the WWUM Model and COHYST acreage was very similar. The difference between the two sources' 1997 to 2005 net change in ground water only acreage amounted to 3,650 acres, or less than 2 percent of either COHYST's or WWUM Model's 2005 total NRD ground water only acreage. See **Appendix E** for additional discussion and results for this comparison.

COMMENTS AND CONCERNS

The items discussed herein are comments or concerns that apply to the acreage assessment effort in general, and may want or need to be addressed by the North Platte and South Platte NRDs in the future.

- The identification of sub-irrigated lands was not completed for this assessment and may need to be addressed in the future. Based on discussions with the Nebraska DNR and preliminary ground water model results, there are areas of land that are potentially being sub-irrigated along the North Platte River. Accounting for sub-irrigated lands impacts surface water and ground water modeling efforts, in terms of irrigation demand and recharge.

- The acreage shapefiles developed herein are intended for planning and modeling purposes only. Additional review and NRD familiarity is needed prior to using them for NRD administrative purposes.

- As discussed in the acreage comparison section, there are surface water irrigation district acreage totals that do not compare as closely as others to available acreage sources. Review of the irrigated lands by irrigation district personnel is strongly recommended, both to garner support from the districts and to reconcile any remaining questionable parcels or service area boundaries.

Appendix A: North Platte Certified Acreage

WWUM Model Irrigated & Dryland Acreage Assessment

Appendix A – North Platte NRD Certified Acreage and Well Association Summary

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To accurately assess irrigated acreage and assign water sources, one of the first steps to completing the WWUM Model irrigated acreage assessment for the North Platte NRD was to complete an inventory of certified acreage and well information for the District. The inventory was completed to confirm that the available data sources could be used to accurately assign well attributes and develop a time series of wells assigned to "certified" irrigated acreage historically. Irrigated lands served by a ground water source, referred to herein as "certified parcels" or "certificates", reflect the amount of land served by one or more assigned well, and are assigned a unique certificate number to facilitate NRD management.

NPNRD Certified Acreage Inventory

Prior to the development of the irrigated acreage assessment, it was important to understand the accounting systems and databases that are maintained by the North Platte NRD, and how the information can be used to accurately represent historical irrigation in the North Platte NRD. The North Platte NRD is broken into two management areas; the North Platte River management area along the North Platte River spanning from the Nebraska/Wyoming state line in Sioux county to the southeast corner of Garden county; and the Pumpkin Creek basin located in Banner county. Pumpkin Creek was historically a live creek that runs parallel and north of the North Platte River, and drains into the North Platte River downstream of the Town of Bridgeport. Due to reduced streamflow in the creek, almost all of the irrigation in the basin is now served by ground water only. Pumpkin Creek Basin is managed by the North Platte NRD as a ground water management sub-area, separate from the remaining North Platte NRD management area. Certified acreage coverages were completed by the North Platte NRD in both of these management areas.

The North Platte NRD undertook efforts to delineate the parcel boundaries of irrigated lands that are served by a ground water source along the North Platte River, its tributaries, and within the Pumpkin Creek basin. These irrigated parcels reflect the amount of land served by one or more assigned well, and are assigned a unique certificate number to facilitate NRD management. Certified parcels may be served by only ground water or may be co-mingled, although the source of surface water is not attributed in the coverages. The parcel boundaries were generally based on Common Land Unit (CLU) boundaries and 2005 aerial imagery and are the most reliable source of spatial irrigated acreage information in NRD areas. Although, the parcels in the NRD certified acreage coverages represent land served by a ground water source, each coverage contains different attributes and different levels of detail.

An initial review of the data prompted discussions with the NPNRD to fully understand the information that was provided. Conference calls and web meetings were arranged to understand the types of acreage in the District, what information is important to maintain for modeling purposes, and how different data sources fit together. Conversations with the NPNRD resulted in the identification of the following shapefiles to be used as a starting point for the historical irrigated and dryland acreage assessments along the North Platte River valley and Pumpkin Creek:

- *North Platte Certified Acreage* - The original North Platte NRD certified acreage coverage, as received on July 22, 2010, included 1,808 certificates, representing over 221,000 acres of certified land.

- *Pumpkin Creek Certified Acreage* - The original Pumpkin Creek certified acreage coverage, as received August 20, 201,0 included 409 certificates, representing over 39,000 acres of certified land.

North Platte Certified Acreage Attribute Review

A review of the attributes assigned to certified parcels in the North Platte NRD was necessary to identify the attributes important to maintain for modeling purposes and any data inconsistencies.

Table A1 contains a summary of the attributes from the original North Platte certified acreage coverage. The attributes that were maintained for the irrigated acreage assessment include certificate number, indication of surface water, first irrigation date, and certification type. The certification type was first used to remove any non-irrigation types. The remaining irrigated parcels then represented the ground water only and co-mingled parcels in the North Platte NRD area used in the assessment.

Table A1: NPNRD Certified Acreage Attributes

Attribute	Description
Cert_Num	Certification number - a unique number assigned to each tract (multi-part polygon) certified for ground water use in the NPNRD
Surface_Wat	Surface water - a yes/no field. *Y* indicates that a tract also has surface water assigned as a source; also referred to as co-mingled tracts. *N* indicates the only source of water for this tract is ground water.
OA	Overappropriated Area – a yes/no field indicating whether the tract is in an Overappropriated Area
HYPERLINK	Hyperlink field that opens the scanned certification (pdf) when activated in GIS at the NPNRD
Date_Cert_1	Date the NPNRD board approved the certification
App_Num_1	Applicant/Owner Number – corresponds to an owner record in the NPNRD database
ContactID	Contact Number – corresponds to a contact record in the NPNRD database
DAUPECIT_1	Allocation Unit ID – allocation units that combine tracts and their water use
First_Irr_1	First Irrigation Date – contains the year the tract was first serviced (i.e. first irrigated) by a ground water well
CertifiedU	Certified Units – contains the units certified to each tract (e.g. units for irrigated tracts are acres)
CertType	Certification Type – indicates the type of certified ground water use (e.g. irrigation, feedlot, commercial, municipal)

Table A2 contains a summary of the attributes from the original Pumpkin Creek certified acreage coverage. Two attributes critical to the acreage assessment efforts were not present in the Pumpkin Creek certified acreage coverage; first irrigation date and certification type. In the absence of a first irrigation date, the minimum well completion date from the DNR of the wells assigned to a certificate was used to provide an estimate of the year that the parcel was first irrigated. In the

absence of a certification type attribute, the wells assigned to each certificate were assessed using the Nebraska DNR well database to determine the permitted use associated with the assigned wells. Certificates with wells permitted for non-irrigation uses (e.g. domestic, industrial) were reviewed using aerial imagery to confirm non-irrigation use. The remaining irrigated parcels represented the ground water only and co-mingled parcels in the Pumpkin Creek Basin area.

Table A2: Pumpkin Creek Certified Acreage Attributes

Attribute	Description
Cert_Num	Certification number - a unique number assigned to each tract (multi-part polygon) certified for ground water use in the NPNRD
OA	Overappropriated Area – a yes/no field indicating whether the tract is in an Overappropriated Area
App_Num_1	Applicant/Owner Number – corresponds to an owner record in the NPNRD database
DAUPECIT_1	Allocation Unit ID – allocation units that combine tracts and their water use
CertifiedU	Certified Units – contains the units certified to each tract (e.g. units for irrigated tracts are acres)

North Platte NRD Certified Acreage Spatial Review

Based on the certified acreage inventory, attribute review, and discussions with NPNRD staff; certified acreage coverages were compiled for North Platte and Pumpkin Creek with only the necessary attributes for the irrigated acreage assessment. The original parcel boundaries in these coverages were generally based on 2005 imagery. Therefore 2005 NAIP imagery was used to spatially review these coverages to confirm parcel boundaries, topology, and identify overlapping polygons. In general there were very few errors; topological issues were corrected and parcel boundaries were revised.

NPNRD Well Inventory and Assignment

Using the reviewed North Platte and Pumpkin Creek certified acreage coverages and supporting tables/geodatabases developed by the North Platte NRD, and the Nebraska Division of Natural Resources well database, a time series of wells assigned to each certified parcel was developed using well completion and NRD first irrigation dates when available. The assignment of wells to each certificate provides the basis for determining when the certified parcels were first irrigated, and the active wells to assign in each irrigated acreage assessment year. Well capacity was also assigned from the DNR well database for modeling purposes. The following approach was used to develop the relationship between certified acreage and wells, the development of well to certificate time series, and quality control processes used to confirm first irrigation dates. The assignment of wells to certificates was a five step process:

1. Nebraska DNR well database was downloaded for all counties located in the NPNRD. This database contains all wells, including replacement wells, associated with a DNR registration number and additional attributes including well completion dates, replacement information, and well capacities.

2. Junction tables with a one-to-many relationship between certificate and well ID were provided by the NPNRD for both North Platte and Pumpkin Creek. Using the junction tables, the DNR well attributes were related to each certificate.
3. Assign minimum well completion dates by certificate and review based on NRD first irrigation dates, when available. Develop minimum well completion date assignments for Pumpkin Creek certificates, and resolve discrepancies between first irrigation dates and minimum well completion dates with the help of the NPNRD.
4. Develop a time series of well IDs assigned to each certificate based on DNR well completion dates and first irrigation dates, accounting for replacement wells. Confirm well capacities and set any missing capacities to 800 gpm (i.e. average of NPNRD wells).
5. Associate the well assignments and first irrigation/minimum well completion dates to the North Platte and Pumpkin Creek certified acre coverages by certificate.

At this point, wells have been assigned to certificates, and a time series of certificates has been developed. This time series of certificates provides a guide as to when certificates begin irrigating throughout the study period. Beginning in 2005, the certified acres were used to determine the irrigation activity throughout the District based on first irrigation/minimum well completion dates. That is, only certificates with a first irrigation date of 1953 to 1997 were included in the 1997 assessment.

NPNRD Comments and Revisions

Revisions and comments made to specific certificates in the North Platte NRD and Pumpkin Creek basin throughout the process described above were tracked and have been included in **Table A3** and **A4,** respectively attached at the end of this appendix.

Primary observations, comments, and revisions for North Platte Certificates include:

- 10 certificates assigned incorrect well registration numbers, revised with help from NPNRD
- 120 certificates with incorrect DNR well completion data; used NPNRD information
- 13 certificates with missing DNR well completion dates, used NPNRD first irrigation date
- 10 certificates are no longer active and were replaced using active certificate
- 2 certificates changed first irrigation dates to match DNR
- 6 certificates changed from SW = Y to SW = N because they were not located in a service area
- 3 certificates are inactive in all assessment years
- 3 certificates were actively irrigating in 1975 based on a visual assessment; changed first irrigation date to 1975
- 6 certificates were actively irrigating in 1984 based on a visual assessment; changed first irrigation date to 1984
- 104 certificates with missing well capacity information and were set to the average well capacity of the District wells (800 gpm)
- 29 certificates, total for 2009 and 2010, that included wells without associated meters

Primary observations, comments, and revisions for Pumpkin Creek Certificates include:

- 12 certificates with minimum well completion date revisions based on information from NPNRD
- 14 certificates identified as non-irrigation certificates and were removed from the irrigated acreage assessment.
- 5 certificates are inactive in all assessment years
- 1 certificate was actively irrigating in 1975 based on a visual assessment; changed first irrigation date to 1975
- 6 certificates were actively irrigating in 1984 based on a visual assessment; changed first irrigation date to 1984
- 42 certificates with missing well capacity information and set to the average well capacity of the District wells (800 gpm)

North Platte First Irrigation Dates Results

In total, there were 2,020 registered wells assigned to 1,808 certificates in the NPNRD with a maximum of 13 wells assigned to one certificate. The earliest well completion date recorded by the Nebraska DNR that is assigned to a North Platte certificate is 1903 and the most recent well was in 2004. **Figure A1** shows certificate activity over time based on the first irrigation dates.

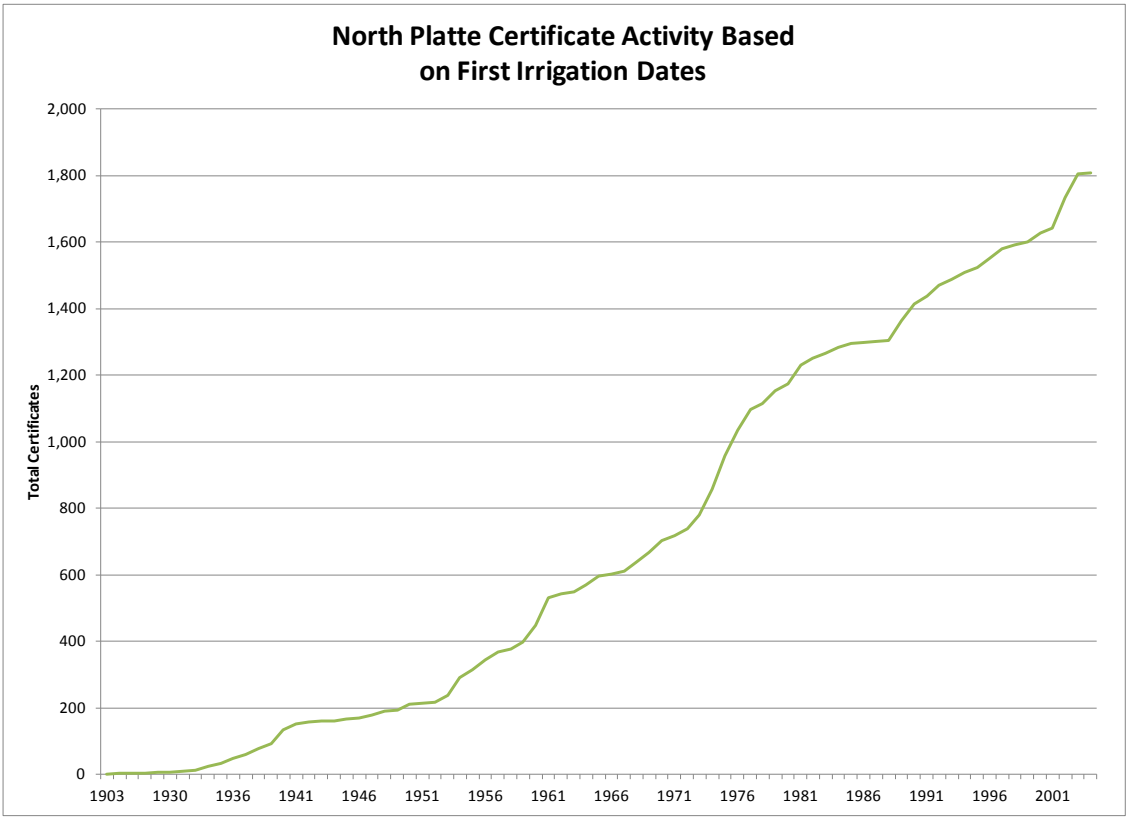

Figure A1: North Platte Certificate Activity

Pumpkin Creek Minimum Well Completion Dates Results

In total, there are 557 registered wells assigned to 409 certificates in Pumpkin Creek with a maximum of 30 wells assigned to one certificate. The earliest well completion date in Pumpkin Creek recorded by the Nebraska DNR that is assigned to a certificate is 1928 and the most recent well was in 2003. **Figure A2** shows certificate activity over time based on the minimum well completion dates.

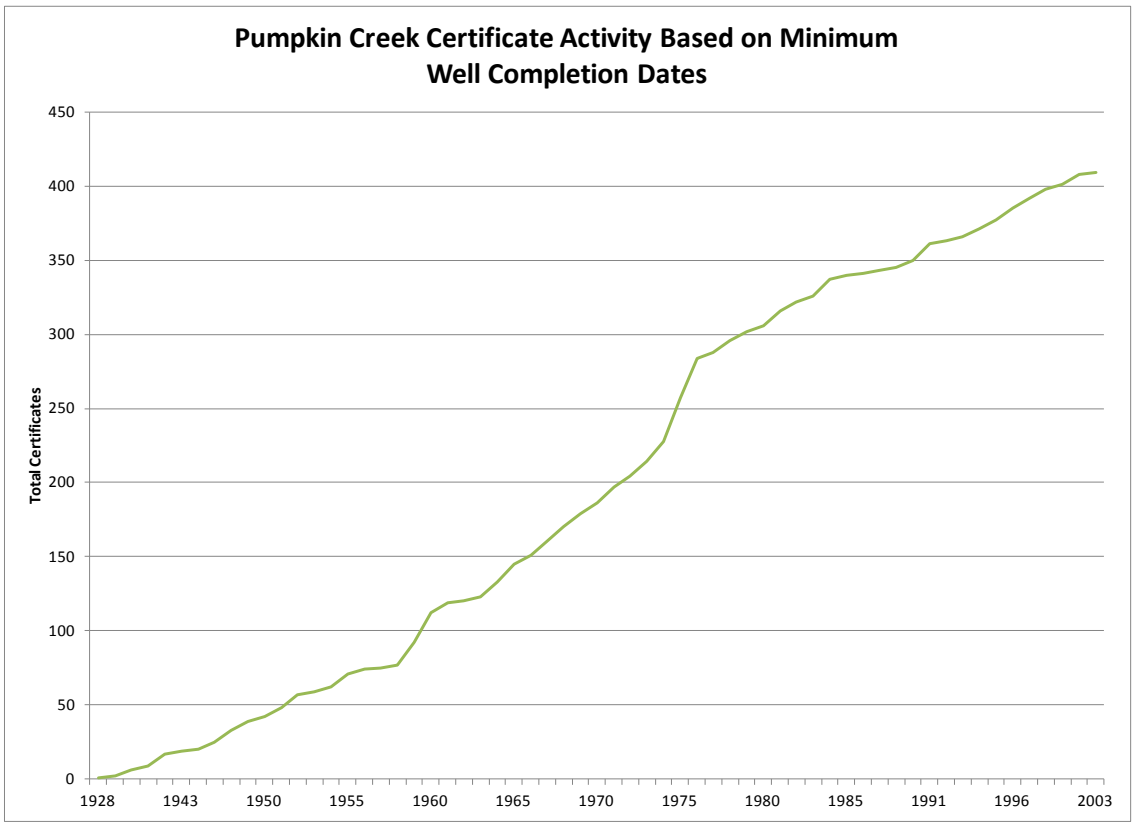

Figure A2: Pumpkin Creek Certificate Activity

CREP/EQIP Lands

CREP and EQIP lands are currently tracked by the NPNRD. Beginning in 2005, certified acreage and surface water only acreage enrolled in either CREP or EQIP programs were no longer irrigated, and remain in these programs for a minimum of ten years. These lands were tracked as a part of the WWUM Model irrigated acreage assessment based on the dates they enrolled in the programs, as provided by the NPNRD. **Table A5** summarizes the CREP and EQIP acres removed from the irrigated acreage assessments and included in the dryland acreage assessments for 2005 through 2010.

Table A5: NPNRD CREP/EQIP Acreage Summary

Year	GW Only (Ac)	SW Only (Ac)	Co-Mingled (Ac)	Total (Ac)	# of Contracts
2005	848	3,583	475	4,907	82
2006	3,227	3,887	699	7,812	30
2007	3,666	3,887	699	8,252	2
2008	4,055	4,140	761	8,957	8
2009	4,137	4,158	807	9,103	6
2010	4,310	4,211	696	9,216	0

Inactive Pumping

Starting in 2003, the NPNRD began their meter reading program in the Pumpkin Creek basin, and in 2009 they began their meter reading program district wide. Meter readings are annual values of total water used and are recorded by certificate. When the meter readings are equal to zero, this is an indication of no water use on the assigned certified acreage during a given year. Certificates with no measured usage (i.e. inactive irrigation) were removed from the WWUM Model irrigated acreage assessments beginning in 2003. **Table A6** summarizes the NPNRD acres removed from the irrigated acreage assessments as a result of inactive pumping and included in the dryland acreage assessments for 2003 through 2010.

Table A6: NPNRD Inactive Pumping Acreage Summary

Year	Certificates With Inactive Pumping	North Platte (Ac)	Pumpkin Creek (Ac)	Total Inactive Pumping Acreage
2003	52	0	3,867	3,867
2004	49	0	3,702	3,702
2005	48	0	3,570	3,570
2006	40	0	3,231	3,231
2007	45	0	3,595	3,595
2008	38	0	3,065	3,065
2009	75	1,844	3,122	4,966
2010	77	1,698	3,845	5,543

No Meter Certificates

"No meter" certificates were identified in 2009 and 2010 by the North Platte NRD. Parcels associated with "No Meters" certificates were inspected beginning in early 2009 and continued through 2010 to confirm the wells were inactive and no ground water irrigation was taking place. Ground water only parcels that were identified as "No Meter" were removed from the irrigated acreage assessments in 2009 and 2010, and were added to the corresponding dryland assessments. Co-mingled certificates identified as "No Meter" were not removed from the 2009 and 2010 assessments, because they can receive surface water supplies. **Table A7** summarizes the NPNRD "No Meter" certificates removed from the irrigated acreage assessments and included in the dryland acreage assessments for 2009 and 2010.

Table A7: NPNRD No Meter Acreage Summary

Year	GW Only No Meter Certificates	North Platte (Ac)
2009	29	1,651
2010	28	1,641

Non-Certified Acreage

Non-certified acres are sprinkler irrigated lands clearly irrigated based on aerial imagery with no known water supply. Non-certified acres were assigned a first irrigation date based on the earliest assessment year that the parcel was identified. Non-certified certificates within the North Platte NRD were assigned certificate numbers 9901-9949, a corresponding well registration numbers (i.e. T-9901), and an average well capacity of 800 gpm. **Table A8** below summarizes non-certified acreage, and first irrigation dates assigned in the North Platte NRD. Note these identified irrigated lands have been provided to the NPNRD to allow the NRD

Table A8: NPNRD Non-Certified Acreage Summary

Certificate #	Registration #	First Irrig. Date	Irrigation Type	1975 (Ac)	1984 (Ac)	1993 (Ac)	1997 (Ac)	2001 (Ac)	2005 (Ac)	2010 (Ac)
9901	T-9901	1975	Sprinkler	133	0	0	0	0	0	0
9902	T-9902	1984	Sprinkler	0	123	123	0	0	0	125
9903	T-9903	1984	Sprinkler	0	134	134	0	0	0	134
9904	T-9904	1984	Sprinkler	0	132	0	0	0	0	0
9905	T-9905	1984	Sprinkler	0	127	0	0	0	0	0
9906	T-9906	1984	Sprinkler	0	141	0	0	0	0	0
9907	T-9907	1984	Sprinkler	0	65	65	0	0	0	0
9908	T-9908	1984	Sprinkler	0	103	103	0	0	0	0
9909	T-9909	1984	Sprinkler	0	137	0	0	0	0	0
9910	T-9910	1984	Sprinkler	0	127	0	0	0	0	0
9911	T-9911	1984	Sprinkler	0	52	52	0	0	0	0
9912	T-9912	1984	Sprinkler	0	52	0	0	0	0	0
9913	T-9913	1984	Sprinkler	0	144	0	0	0	0	126
9914	T-9914	1984	Sprinkler	0	210	210	0	0	0	0
9915	T-9915	1984	Sprinkler	0	136	0	0	0	0	0
9916	T-9916	1984	Sprinkler	0	126	126	126	126	126	126
9917	T-9917	1984	Sprinkler	0	133	133	133	133	133	133
9918	T-9918	1984	Sprinkler	0	137	165	162	162	162	162
9919	T-9919	1975	Sprinkler	127	127	127	0	0	0	0
9920	T-9920	1984	Sprinkler	0	32	32	0	0	0	0
9921	T-9921	1984	Sprinkler	0	31	31	0	0	0	0
9922	T-9922	1984	Sprinkler	0	9	9	9	9	9	9
9923	T-9923	1984	Sprinkler	0	63	0	0	0	0	0
9924	T-9924	1984	Sprinkler	0	68	0	0	0	0	0
9926	T-9926	1997	Sprinkler	0	0	0	78	78	78	64
9927	T-9927	1997	Sprinkler	0	0	0	132	132	132	132
9928	T-9928	1993	Sprinkler	0	0	77	78	0	0	78
9929	T-9929	2005	Sprinkler	0	0	0	0	0	119	119
9933	T-9933	2010	Sprinkler	0	0	0	0	0	0	128

Certificate #	Registration #	First Irrig. Date	Irrigation Type	1975 (Ac)	1984 (Ac)	1993 (Ac)	1997 (Ac)	2001 (Ac)	2005 (Ac)	2010 (Ac)
9935	T-9935	2010	Sprinkler	0	0	0	0	0	0	119
9936	T-9936	2010	Sprinkler	0	0	0	0	0	0	60
Total Acreage				**260**	**2,410**	**1,387**	**718**	**640**	**759**	**1,514**

Table A3: North Platte Certified Acreage Comments and Revisions

Certificate Number	Well Reg. # Count	First Irrigation Date	Ave. Pumping Capacity (gpm)	Comment/Revision
1512	1	1979	250	Inactive Certificate, Replaced by 3473 and 3474
1513	1	1975	200	Visually No Irrigation (1975)
1516	1	1940	1100	DNR Well Completion Date Missing, used NPNRD First Irrigation Date
1517	1	1997	800	DNR well completion data incorrect, used NPNRD Data
1518	1	1997	500	DNR well completion data incorrect, used NPNRD Data
1520	1	1982	750	DNR Well Completion Date Missing, used NPNRD First Irrigation Date
1523	2	1961	925	Well Replacement done Incorrectly. Changed the Registration Number Original RegNum G-021252 1961 is correct
1525	2	1953	850	DNR well completion data incorrect, used NPNRD Data. Missing Well Capacity, Set to 800 gpm.
1534	1	1975	1000	Visually No Irrigation (1975)
1535	1	1940	800	Missing Well Capacity, Set to 800 gpm.
1537	2	1974	600	Visually No Irrigation (2001/2005)
1549	1	1974	800	Visually No Irrigation (1975)
1553	1	1971	900	DNR well completion data incorrect, used NPNRD Data
1555	1	1973	500	DNR well completion data incorrect, used NPNRD Data
1571	2	1940	1086	Well Replacement done Incorrectly. Changed the Registration Number Original RegNum A-003261, well completion = 1940 is now correct. Missing Well Capacity, Set to 800 gpm.
1572	1	1974	800	Visually No Irrigation (1975)
1574	1	1975	1109	Visually No Irrigation (1975)
1578	1	1975	250	DNR well completion data incorrect, used NPNRD Data
1579	1	1975	948	Visually No Irrigation (1975)
1580	1	1975	1109	Visually No Irrigation (1975)
1582	1	1975	1005	Visually No Irrigation (1975)
1594	1	1974	2198	DNR well completion data incorrect, used NPNRD Data
1595	1	1974	2680	DNR well completion data incorrect, used NPNRD Data
1607	1	1975	1109	Visually No Irrigation (1975)
1610	3	1937	1333	Missing Well Capacity, Set to 800 gpm.
1611	2	1934	1000	Missing Well Capacity, Set to 800 gpm.
1615	1	1959	200	DNR well completion data incorrect, used NPNRD Data
1617	1	1975	900	Visually No Irrigation (1975/1984)
1618	1	1975	1900	Visually No Irrigation (1975)
1620	1	1975	668	Visually No Irrigation (1975/1984/1993)
1624	1	1973	1040	DNR well completion data incorrect, used NPNRD Data
1632	2	1972	725	Missing Well Capacity, Set to 800 gpm.
1645	1	1975	982	Visually No Irrigation (1975)
1650	3	1937	1333	Missing Well Capacity, Set to 800 gpm.
1660	1	1989	2332	DNR well completion data incorrect, used NPNRD Data

Certificate Number	Well Reg. # Count	First Irrigation Date	Ave. Pumping Capacity (gpm)	Comment/Revision
1661	1	1975	2680	Visually No Irrigation (1975)
1665	1	1974	700	Visually No Irrigation (1975)
1672	1	1975	675	Visually No Irrigation (1975)
1678	1	1963	900	DNR well completion data incorrect, used NPNRD Data
1679	3	1952	1575	DNR well completion data incorrect, used NPNRD Data
1683	1	1974	750	Visually No Irrigation (1975)
1686	2	1956	550	Visually No Irrigation (1975)
1691	1	1976	1902	DNR well completion data incorrect, used NPNRD Data
1692	2	1948	849	Missing Well Capacity, Set to 800 gpm.
1696	1	1975	200	Visually No Irrigation (1975)
1698	1	1953	800	Missing Well Capacity, Set to 800 gpm.
1713	1	1948	660	DNR well completion data incorrect, used NPNRD Data
1725	1	1959	2000	Inactive Certificate, Replaced with 3496 and 3497
1727	2	1952	850	DNR well completion data incorrect, used NPNRD Data
1729	2	1954	2902	DNR well completion data incorrect, used NPNRD Data
1734	2	1948	775	Well Replacement done Incorrectly DNR changed the Registration Number Original RegNum G-002605, We believe DNR Date (1940) is wrong use NPNRD Data (1948). Missing Well Capacity, Set to 800 gpm.
1735	1	1975	1925	Visually No Irrigation (1975)
1736	2	1973	1600	DNR well completion data incorrect, used NPNRD Data
1740	1	1974	1005	Visually No Irrigation (1975)
1762	1	2002	900	DNR well completion data incorrect, used NPNRD Data
1775	2	1966	1450	DNR well completion data incorrect, used NPNRD Data
1795	1	1974	400	Visually No Irrigation (1975)
1808	1	1977	1500	DNR well completion data incorrect, used NPNRD Data
1810	1	1975	700	Visually No Irrigation (1975)
1827	2	1954	1150	Missing Well Capacity, Set to 800 gpm.
1836	2	1970	468	Visually No Irrigation (1975)
1843	1	1974	1500	Visually No Irrigation (1975)
1844	1	1974	1334	DNR well completion data incorrect, used NPNRD Data. Visually No Irrigation (1975).
1849	1	1975	840	Visually No Irrigation (1975)
1850	1	1954	800	Missing Well Capacity, Set to 800 gpm.
1853	1	1979	800	DNR well completion data incorrect, used NPNRD Data
1860	1	2002	900	DNR well completion data incorrect, used NPNRD Data
1861	1	1975	800	DNR well completion data incorrect, used NPNRD Data. Visually No Irrigation (1975).
1864	1	1940	800	Missing Well Capacity, Set to 800 gpm.
1865	1	2003	300	DNR well completion data incorrect, used NPNRD Data
1866	1	1984	800	Visually active Pivot in 1984 (LRE), Changed First Irr to 1984
1872	2	1937	700	Missing Well Capacity, Set to 800 gpm.
1875	5	1991	565	Visually No Irrigation (1993/1997). Missing Well Capacity, Set to 800 gpm.

Certificate Number	Well Reg. # Count	First Irrigation Date	Ave. Pumping Capacity (gpm)	Comment/Revision
1883	2	1953	1200	Inactive Certificate, Replaced by 3478 and 3479
1885	1	1965	1200	DNR well completion data incorrect, used NPNRD Data
1891	1	1941	800	Missing Well Capacity, Set to 800 gpm.
1896	1	1950	1370	DNR Well Completion Date Missing, used NPNRD First Irrigation Date
1900	1	2002	800	Missing Well Capacity, Set to 800 gpm.
1904	2	1938	1578	DNR well completion data incorrect, used NPNRD Data
1905	1	1938	3000	DNR well completion data incorrect, used NPNRD Data
1906	1	1938	1400	DNR well completion data incorrect, used NPNRD Data
1907	1	1938	800	DNR well completion data incorrect, used NPNRD Data. Missing Well Capacity, Set to 800 gpm.
1910	1	1974	900	Visually No Irrigation (1975)
1919	1	1959	1500	DNR well completion data incorrect, used NPNRD Data
1921	3	1973	705	DNR well completion data incorrect, used NPNRD Data
1923	4	1970	729	Visually No Irrigation (1975). Missing Well Capacity, Set to 800 gpm.
1925	1	1974	800	Visually No Irrigation (1975)
1928	1	2001	200	DNR well completion data incorrect, used NPNRD Data
1929	1	2001	300	DNR well completion data incorrect, used NPNRD Data
1933	1	1981	883	Visually No Irrigation (1984/1993/1997)
1944	4	1961	538	Missing Well Capacity, Set to 800 gpm.
1951	1	1955	800	Missing Well Capacity, Set to 800 gpm.
1958	1	1994	3006	DNR well completion data incorrect, used NPNRD Data
1965	1	1972	3006	Visually No Irrigation (1975)
1966	1	1975	1300	Visually No Irrigation (1975)
1967	1	1975	1300	Visually No Irrigation (1975)
1968	1	1975	1500	Visually No Irrigation (1975)
1969	1	1975	1300	Visually No Irrigation (1975)
1981	2	1984	750	Visually active Pivot in 1984 (LRE), Changed First Irr to 1984
1982	1	1974	650	Visually No Irrigation (1975)
1989	1	1975	2332	Visually No Irrigation (1975)
1999	1	1970	1300	DNR Date 1970 Correct (Revised 1999 Certificate First Irrigation Date = 1970)
2005	1	1975	2140	DNR well completion data incorrect, used NPNRD Data
2008	1	1982	700	DNR Well Completion Date Missing, used NPNRD First Irrigation Date
2012	2	1938	1200	DNR well completion data incorrect, used NPNRD Data
2022	1	2003	1800	DNR well completion data incorrect, used NPNRD Data
2035	1	1903	1100	DNR well completion data incorrect, used NPNRD Data
2041	1	1972	800	DNR well completion data incorrect, used NPNRD Data. Missing Well Capacity, Set to 800 gpm.
2043	1	1975	800	Missing Well Capacity, Set to 800 gpm.
2047	1	1986	900	DNR well completion data incorrect, used NPNRD Data

Certificate Number	Well Reg. # Count	First Irrigation Date	Ave. Pumping Capacity (gpm)	Comment/Revision
2050	2	1978	1150	Well Replacement done Incorrectly. Changed the Registration Number Original RegNum G-060314 well completion = 1978 is correct.
2051	1	1961	1920	Inactive Certificate, Replaced by Cert 3493
2060	1	1981	900	DNR well completion data incorrect, used NPNRD Data
2065	1	1939	750	DNR well completion data incorrect, used NPNRD Data
2079	1	1964	1300	DNR well completion data incorrect, used NPNRD Data
2082	1	1956	800	DNR well completion data incorrect, used NPNRD Data
2083	1	1960	1250	DNR well completion data incorrect, used NPNRD Data
2085	1	1975	1300	Visually No Irrigation (1975)
2096	1	1973	700	Visually No Irrigation (1975)
2104	1	1956	700	DNR well completion data incorrect, used NPNRD Data
2106	1	1954	800	Missing Well Capacity, Set to 800 gpm.
2136	1	1974	1500	DNR well completion data incorrect, used NPNRD Data. Visually No Irrigation (1975).
2137	1	1975	850	DNR well completion data incorrect, used NPNRD Data. Visually No Irrigation (1975).
2138	1	1974	800	Visually No Irrigation (1975)
2141	1	1969	600	Visually No Irrigation (1975)
2143	1	2001	1700	DNR well completion data incorrect, used NPNRD Data
2149	1	1975	750	Certificated 2149 (G-120721) (First Irr = 1990) are evident in 1975 imagery as irrigated pivots, first irrigation dates changed to 1975.
2150	1	1975	750	Certificated 2150 (G-114781) (First Irr = 2002) are evident in 1975 imagery as irrigated pivots, first irrigation dates changed to 1975.
2156	6	2003	467	Although First Irrigated in 1975, Wells not complete until 2003. First Irr = 2003
2158	1	1957	575	DNR well completion data incorrect, used NPNRD Data
2160	1	1960	2680	Visually No Irrigation (1975/1984)
2162	5	2003	510	Although First Irrigated in 1975, Wells not complete until 2003. First Irr = 2003
2163	8	1984	259	Visually active Pivot in 1984 (LRE). Changed First Irr to 1984.
2167	3	1974	407	Visually No Irrigation (1975)
2169	2	1980	500	DNR well completion data incorrect, used NPNRD Data
2173	1	1957	575	Changed First IRR from 1960 to 1957 to match DNR.
2177	1	1969	1000	DNR well completion data incorrect, used NPNRD Data
2180	1	1936	650	DNR well completion data incorrect, used NPNRD Data
2183	1	1937	800	DNR well completion data incorrect, used NPNRD Data. Missing Well Capacity, Set to 800 gpm.
2192	1	1975	3006	Visually No Irrigation (1975)
2193	1	1974	550	Visually No Irrigation (1975)
2195	1	1975	1300	Visually No Irrigation (1975)
2197	1	1975	1375	Visually No Irrigation (1975)
2198	1	1974	1742	Visually No Irrigation (1975)

Certificate Number	Well Reg. # Count	First Irrigation Date	Ave. Pumping Capacity (gpm)	Comment/Revision
2200	1	1974	1092	Visually No Irrigation (1975)
2203	1	1975	747	Visually No Irrigation (1975)
2204	1	1975	668	Visually No Irrigation (1975)
2207	1	1975	700	Visually No Irrigation (1975)
2208	1	1982	500	DNR well completion data incorrect, used NPNRD Data
2209	2	1982	456	DNR Well Completion Date Missing, used NPNRD First Irrigation Date
2211	1	1993	800	Missing Well Capacity, Set to 800 gpm.
2214	1	1990	800	Missing Well Capacity, Set to 800 gpm.
2218	1	1950	650	DNR well completion data incorrect, used NPNRD Data
2221	1	1954	800	DNR well completion data incorrect, used NPNRD Data
2223	1	1975	450	Inactive Certificate, Replaced by Cert 3492
2225	1	1982	800	Inactive Certificate, Replaced by Cert 3492
2227	2	1975	800	Inactive Certificate, Replaced by Cert 3492
2230	2	1950	955	Missing Well Capacity, Set to 800 gpm.
2232	2	1969	1020	Well Replacement done Incorrectly, changed the Registration Number Original RegNum A-006705, We believe well completion date (1954) is wrong use NPNRD Data (1969). Missing Well Capacity, Set to 800 gpm.
2233	2	1974	1275	Visually No Irrigation (1975)
2235	2	1975	700	Changed from SW = Y to SW = N because they are not in a service area. Visually No Irrigation (1975)
2240	1	1954	1000	DNR well completion data incorrect, used NPNRD Data
2244	1	1975	800	Change First Irr from 1980 to 1975 for cert 2244, visually a pivot irrigating in 1975 imagery.
2251	1	1976	1253	DNR well completion data incorrect, used NPNRD Data
2252	1	1978	1400	Changed from SW = Y to SW = N because they are not in a service area.
2257	3	1972	307	Visually No Irrigation (1975)
2262	1	2001	1000	DNR well completion data incorrect, used NPNRD Data
2272	1	1969	750	DNR well completion data incorrect, used NPNRD Data
2287	2	1956	980	Missing Well Capacity, Set to 800 gpm.
2292	1	1973	1200	DNR well completion data incorrect, used NPNRD Data
2299	2	1940	1086	Well Replacement done Incorrectly. Changed the Registration Number Original RegNum A-003261, well completion = 1940 is now correct
2308	1	1954	800	Missing Well Capacity, Set to 800 gpm.
2314	2	1975	600	Visually No Irrigation (1975)
2316	1	1975	600	Visually No Irrigation (1975)
2319	1	1975	1662	Visually No Irrigation (1975)
2331	2	1978	850	Missing Well Capacity, Set to 800 gpm.
2335	2	1957	1055	Missing Well Capacity, Set to 800 gpm.
2337	1	1974	2568	Visually No Irrigation (1975)
2345	1	1975	700	Visually No Irrigation (1975)
2347	1	1975	700	Visually No Irrigation (1975)

Certificate Number	Well Reg. # Count	First Irrigation Date	Ave. Pumping Capacity (gpm)	Comment/Revision
2348	1	1975	700	Visually No Irrigation (1975)
2349	1	1975	700	Visually No Irrigation (1975)
2352	1	1975	1300	Visually No Irrigation (1975)
2357	1	1975	550	Visually No Irrigation (1975)
2364	1	1977	800	DNR well completion data incorrect, used NPNRD Data
2366	1	1984	700	Visually active Pivot in 1984 (LRE), Changed First Irr to 1984.
2372	1	1905	550	DNR well completion data incorrect, used NPNRD Data
2389	1	1950	800	Missing Well Capacity, Set to 800 gpm.
2393	2	1938	1000	Missing Well Capacity, Set to 800 gpm.
2417	1	1973	1253	Visually No Irrigation (1975)
2418	1	1974	1400	Visually No Irrigation (1975)
2429	3	1962	1067	Well Replacement done Incorrectly. Changed the assigned Registration Number to the Original RegNum G-022006, well completion = 1962
2435	2	1982	750	Missing Well Capacity, Set to 800 gpm.
2436	2	1982	750	Missing Well Capacity, Set to 800 gpm.
2439	1	1960	1853	Inactive Certificate, No Irrigation Field Boundaries
2462	1	2003	400	Changed from SW = Y to SW = N because they are not in a service area.
2463	1	1969	1000	Changed from SW = Y to SW = N because they are not in a service area.
2465	1	1973	800	Changed from SW = Y to SW = N because they are not in a service area.
2474	1	1996	900	DNR well completion data incorrect, used NPNRD Data
2477	1	1974	1200	Visually No Irrigation (1975)
2480	2	1939	1150	Well Replacement done Incorrectly DNR changed the Registration Number Original RegNum G-065457, We believe DNR Date (1953) is wrong use NPNRD Data (1939)
2489	1	1981	650	Visually No Irrigation (2005)
2494	1	1975	300	DNR well completion data incorrect, used NPNRD Data
2495	3	1975	567	DNR well completion data incorrect, used NPNRD Data
2513	1	1979	1870	Cert 2513 (G-062582) was recended in 2008, set end dates = 2008.
2522	2	1994	550	DNR well completion data incorrect, used NPNRD Data
2528	1	1945	1400	DNR well completion data incorrect, used NPNRD Data
2530	2	1955	850	Missing Well Capacity, Set to 800 gpm.
2535	1	1974	550	Visually No Irrigation (1975)
2545	6	2003	467	Although First Irrigated in 1975, Wells not complete until 2003. First Irr = 2003
2553	1	1971	900	Changed from SW = Y to SW = N because they are not in a service area.
2559	2	1966	638	Well Replacement done Incorrectly DNR changed the Registration Number Original RegNum G-025957 1966 is correct
2565	1	2004	750	DNR well completion data incorrect, used NPNRD Data

Certificate Number	Well Reg. # Count	First Irrigation Date	Ave. Pumping Capacity (gpm)	Comment/Revision
2595	1	1942	800	Missing Well Capacity, Set to 800 gpm.
2597	3	1954	583	Missing Well Capacity, Set to 800 gpm.
2599	1	1976	800	Missing Well Capacity, Set to 800 gpm.
2600	1	1976	800	Missing Well Capacity, Set to 800 gpm.
2601	1	1975	1742	Visually No Irrigation (1975)
2604	2	1938	1750	Inactive Certificate, Replaced by 3475 and 3476
2610	2	1960	350	Visually No Irrigation (1975)
2612	1	1954	800	Missing Well Capacity, Set to 800 gpm.
2620	2	1962	250	Inactive Certificate, Replaced by Cert 26201
2621	2	1975	600	Visually No Irrigation (1975)
2623	1	1975	600	Visually No Irrigation (1975)
2627	2	1956	750	Missing Well Capacity, Set to 800 gpm.
2629	1	1947	800	Missing Well Capacity, Set to 800 gpm.
2635	1	1975	2680	Visually No Irrigation (1975)
2650	1	1984	2332	Visually active Pivot in 1984 (LRE), Changed First Irr to 1984.
2656	1	1960	800	Missing Well Capacity, Set to 800 gpm.
2665	1	1990	900	DNR well completion data incorrect, used NPNRD Data
2666	2	1953	800	Missing Well Capacity, Set to 800 gpm.
2671	1	1973	650	DNR well completion data incorrect, used NPNRD Data
2673	1	1973	650	DNR well completion data incorrect, used NPNRD Data. Visually No Irrigation (1975).
2674	1	1971	2568	DNR well completion data incorrect, used NPNRD Data
2675	1	1997	875	DNR well completion data incorrect, used NPNRD Data
2676	1	1974	700	DNR well completion data incorrect, used NPNRD Data. Visually No Irrigation (1975).
2679	1	1997	850	DNR well completion data incorrect, used NPNRD Data
2681	1	1953	1100	DNR well completion data incorrect, used NPNRD Data
2683	1	1989	775	DNR well completion data incorrect, used NPNRD Data
2686	3	1954	967	DNR Well Completion Date Missing, used NPNRD First Irrigation Date
2688	1	1939	800	Missing Well Capacity, Set to 800 gpm.
2699	1	1961	800	Missing Well Capacity, Set to 800 gpm.
2706	1	1974	650	DNR well completion data incorrect, used NPNRD Data. Visually No Irrigation (1975).
2713	1	1997	1200	DNR well completion data incorrect, used NPNRD Data
2716	2	1955	1000	Missing Well Capacity, Set to 800 gpm.
2721	1	1955	800	Missing Well Capacity, Set to 800 gpm.
2725	3	1974	858	Visually No Irrigation (1975). Missing Well Capacity, Set to 800 gpm.
2726	1	1974	800	Visually No Irrigation (1975). Missing Well Capacity, Set to 800 gpm.
2727	4	1974	641	Visually No Irrigation (1975). Missing Well Capacity, Set to 800 gpm.
2728	3	1974	886	Visually No Irrigation (1975)

Certificate Number	Well Reg. # Count	First Irrigation Date	Ave. Pumping Capacity (gpm)	Comment/Revision
2729	4	1974	1130	Visually No Irrigation (1975)
2730	3	1975	500	Visually No Irrigation (1975)
2735	1	1975	1300	Visually No Irrigation (1975)
2737	1	1993	800	Missing Well Capacity, Set to 800 gpm.
2739	3	1955	367	DNR well completion data incorrect, used NPNRD Data. Missing Well Capacity, Set to 800 gpm.
2744	1	1975	700	Visually No Irrigation (1975)
2752	4	1954	642	Visually No Irrigation (1975)
2755	5	1984	425	DNR Well Completion Date Missing, used NPNRD First Irrigation Date
2770	1	1940	800	Certified acreaage assigned both SW = Y and SW = N. All lands assigned SW = Y. Missing Well Capacity, Set to 800 gpm.
2775	1	1975	700	Visually No Irrigation (1975)
2798	1	1974	1050	Visually No Irrigation (1975)
2800	1	1944	800	Missing Well Capacity, Set to 800 gpm.
2802	2	1989	650	Missing Well Capacity, Set to 800 gpm.
2803	1	1974	2000	Visually No Irrigation (1975)
2804	1	1954	1500	DNR Well Completion Date Missing, used NPNRD First Irrigation Date
2808	1	1975	1025	Visually No Irrigation (1975)
2810	1	1975	1005	Visually No Irrigation (1975)
2811	1	2001	800	Missing Well Capacity, Set to 800 gpm.
2813	1	2003	800	Missing Well Capacity, Set to 800 gpm.
2822	1	1996	700	Visually No Irrigation (1997)
2825	1	1975	800	Visually No Irrigation (1975)
2841	4	1973	533	Missing Well Capacity, Set to 800 gpm.
2846	1	2003	800	Certificate 2846 is not active until 2010. Visually there are no irrigated areas to assign in 2005.
2849	1	2004	750	DNR well completion data incorrect, used NPNRD Data
2866	1	1994	900	DNR Well Completion Date Missing, used NPNRD First Irrigation Date
2870	1	2001	900	DNR well completion data incorrect, used NPNRD Data
2872	1	1944	800	Missing Well Capacity, Set to 800 gpm.
2880	2	1943	575	Cert 2880 originally assigned both SW = Y and SW = N. All lands assigned SW = Y.
2881	1	1990	1500	Cert 2881 originally assigned both SW = Y and SW = N. All lands assigned SW = Y.
2886	1	1954	800	Missing Well Capacity, Set to 800 gpm.
2887	1	1990	625	DNR well completion data incorrect, used NPNRD Data
2907	4	1974	388	Visually No Irrigation (1975)
2908	3	1974	617	Visually No Irrigation (1975). Missing Well Capacity, Set to 800 gpm.
2909	2	1974	1077	Visually No Irrigation (1975)
2910	1	1974	800	Visually No Irrigation (1975)
2911	2	1974	802	Visually No Irrigation (1975)

Certificate Number	Well Reg. # Count	First Irrigation Date	Ave. Pumping Capacity (gpm)	Comment/Revision
2912	2	1974	559	Visually No Irrigation (1975)
2913	2	1974	625	Visually No Irrigation (1975)
2914	3	1974	650	Visually No Irrigation (1975)
2915	2	1975	713	Visually No Irrigation (1975)
2916	3	1974	626	Visually No Irrigation (1975)
2917	3	1974	433	Visually No Irrigation (1975)
2918	2	1974	525	Visually No Irrigation (1975)
2919	2	1974	600	Visually No Irrigation (1975)
2920	2	1947	775	DNR well completion data incorrect, used NPNRD Data. Visually No Irrigation (1953/1975). Missing Well Capacity, Set to 800 gpm.
2922	1	1954	800	Missing Well Capacity, Set to 800 gpm.
2923	2	1935	775	Missing Well Capacity, Set to 800 gpm.
2925	1	1961	800	DNR Well Completion Date Missing, used NPNRD First Irrigation Date. Missing Well Capacity, Set to 800 gpm.
2926	1	1936	800	Certificate 2926 is no longer active after 1975. Visually there are no irrigated areas to assign. Missing Well Capacity, Set to 800 gpm.
2964	1	2003	800	Missing Well Capacity, Set to 800 gpm.
2979	1	1983	800	Missing Well Capacity, Set to 800 gpm.
2985	1	1990	800	Missing Well Capacity, Set to 800 gpm.
2989	1	1954	800	Missing Well Capacity, Set to 800 gpm.
2990	1	1936	800	Missing Well Capacity, Set to 800 gpm.
3000	1	1994	800	DNR Well Completion Date Missing, used NPNRD First Irrigation Date. Missing Well Capacity, Set to 800 gpm.
3001	8	1970	1412	DNR well ID except NR75 was confirmed by Jeff Sprock as not having a DNR well ID match. Therefore the well ID (NR75) was matched to cert 3001 and was confirmed that cert 3001 still has irrigation wells assigned.
3004	1	2003	800	Inactive Certificate, No Irrigation Field Boundaries
3025	1	1950	800	Missing Well Capacity, Set to 800 gpm.
3032	2	1940	1100	Missing Well Capacity, Set to 800 gpm.
3038	1	1959	960	DNR well completion data incorrect, used NPNRD Data
3039	1	1973	500	DNR well completion data incorrect, used NPNRD Data
3049	1	1945	1200	DNR well completion data incorrect, used NPNRD Data
3054	2	1934	1073	Missing Well Capacity, Set to 800 gpm.
3055	2	1934	1073	Missing Well Capacity, Set to 800 gpm.
3067	1	1974	500	Visually No Irrigation (1975)
3069	1	1987	800	Missing Well Capacity, Set to 800 gpm.
3071	1	1975	800	Missing Well Capacity, Set to 800 gpm.
3075	1	1975	1542	Visually No Irrigation (1975)
3078	1	1965	2000	Visually No Irrigation (1975)
3088	1	1954	800	Missing Well Capacity, Set to 800 gpm.
3093	1	1990	750	DNR Well Completion Date Missing, used NPNRD First Irrigation Date

Certificate Number	Well Reg. # Count	First Irrigation Date	Ave. Pumping Capacity (gpm)	Comment/Revision
3119	3	1975	667	Visually No Irrigation (1975)
3126	2	1940	1030	Missing Well Capacity, Set to 800 gpm.
3127	2	1940	875	Well Replacement done Incorrectly. Changed the Registration Number Original RegNum A-003261, well completion = 1940 is now correct. Missing Well Capacity, Set to 800 gpm.
3136	2	1974	875	Missing Well Capacity, Set to 800 gpm.
3165	1	1954	600	DNR well completion data incorrect, used NPNRD Data
3179	1	1982	45	DNR well completion data incorrect, used NPNRD Data
3182	1	1978	580	DNR well completion data incorrect, used NPNRD Data
3183	1	1977	1000	DNR well completion data incorrect, used NPNRD Data
3185	2	1933	1350	DNR well completion data incorrect, used NPNRD Data
3192	1	1975	1250	Visually No Irrigation (1975)
3197	2	1924	800	Missing Well Capacity, Set to 800 gpm.
3198	1	2003	500	DNR well completion data incorrect, used NPNRD Data
3200	2	1994	675	Missing Well Capacity, Set to 800 gpm.
3213	3	1977	460	DNR well completion data incorrect, used NPNRD Data
3214	1	1942	450	DNR well completion data incorrect, used NPNRD Data
3236	1	1965	3500	DNR Well Completion Date Missing, used NPNRD First Irrigation Date
3241	1	2003	600	DNR well completion data incorrect, used NPNRD Data
3269	2	1999	550	DNR well completion data incorrect, used NPNRD Data
3282	2	1992	1100	Missing Well Capacity, Set to 800 gpm.
3290	1	1992	800	DNR well completion data incorrect, used NPNRD Data
3293	1	1989	1200	Inactive Certificate, No Irrigation Field Boundaries
3296	1	1984	750	Visually active Pivot in 1984 (LRE), Changed First Irr to 1984.
3297	1	2000	750	DNR well completion data incorrect, used NPNRD Data
3313	3	1938	933	Missing Well Capacity, Set to 800 gpm.
3323	2	1975	618	Visually No Irrigation (1975)
3329	2	1953	1400	Missing Well Capacity, Set to 800 gpm.
3330	2	1953	1400	Missing Well Capacity, Set to 800 gpm.
3331	2	1991	900	Missing Well Capacity, Set to 800 gpm.
3333	3	1953	1533	DNR well completion data incorrect, used NPNRD Data
3335	4	1954	813	Missing Well Capacity, Set to 800 gpm.
3341	1	1961	1000	DNR well completion data incorrect, used NPNRD Data
3343	1	1970	800	Missing Well Capacity, Set to 800 gpm.
3347	2	2003	175	DNR well completion data incorrect, used NPNRD Data
3350	3	1955	554	Missing Well Capacity, Set to 800 gpm.
3354	1	2002	650	DNR well completion data incorrect, used NPNRD Data
3359	1	1987	1200	DNR well completion data incorrect, used NPNRD Data
3366	1	1990	1350	DNR well completion data incorrect, used NPNRD Data
3370	1	2002	1300	DNR well completion data incorrect, used NPNRD Data
3374	1	1982	800	Missing Well Capacity, Set to 800 gpm.

Certificate Number	Well Reg. # Count	First Irrigation Date	Ave. Pumping Capacity (gpm)	Comment/Revision
3375	1	1947	900	DNR well completion data incorrect, used NPNRD Data
3376	1	1954	800	Missing Well Capacity, Set to 800 gpm.
3377	1	1954	800	Missing Well Capacity, Set to 800 gpm.
3380	1	1947	900	DNR well completion data incorrect, used NPNRD Data
3381	1	1979	20	DNR well completion data incorrect, used NPNRD Data
3383	1	1976	450	DNR well completion data incorrect, used NPNRD Data
3413	1	1970	400	Visually No Irrigation (1975)
3417	1	2003	1200	DNR well completion data incorrect, used NPNRD Data
3420	1	1973	585	Visually No Irrigation (1975)
3421	2	1976	500	Missing Well Capacity, Set to 800 gpm.
3422	1	1975	950	Visually No Irrigation (1975)
3426	1	1988	2000	DNR well completion data incorrect, used NPNRD Data
3430	1	1975	950	Visually No Irrigation (1975)
3438	1	1959	1500	DNR well completion data incorrect, used NPNRD Data
3449	1	1979	800	Missing Well Capacity, Set to 800 gpm.
3456	1	1972	800	Missing Well Capacity, Set to 800 gpm.
3470	1	1988	800	Inactive Certificate, Replaced by 3480 and 3481. Missing Well Capacity, Set to 800 gpm.
3472	1	1994	800	DNR well completion data incorrect, used NPNRD Data
3479	1	1953	1200	DNR well completion data incorrect, used NPNRD Data
3480	1	1988	800	Missing Well Capacity, Set to 800 gpm.
3481	1	1988	800	Missing Well Capacity, Set to 800 gpm.
3488	3	1955	1593	DNR well completion data incorrect, used NPNRD Data
26101	2	1960	350	Visually No Irrigation (1975)

Table A4: Pumpkin Creek Certified Acreage Comments and Revisions

Certificate Number	Well Reg. # Count	First Irrigation Date	Average Pumping Capacity (gpm)	Comment/Revision
1250	9	1938	431	8 wells 1980 1 well 1938 DNR Date Correct. Inactive Irrigation (1953, 1975)
1245	9	1938	431	8 wells 1980 1 well 1938 DNR Date Correct. Inactive Irrigation (1953, 1975)
1246	9	1938	431	8 wells 1980 1 well 1938 DNR Date Correct. Inactive Irrigation (1953, 1975)
1223	2	1975	350	Active Pivot Irrigation (1975), Changed First Irr to 1975
1010	1	1984	799	Active Pivot Irrigation (1984), Changed First Irr to 1984
1278	1	1984	20	Active Pivot Irrigation (1984), Changed First Irr to 1984
1322	1	1984	700	Active Pivot Irrigation (1984), Changed First Irr to 1984
1379	1	1984	1,400	Active Pivot Irrigation (1984), Changed First Irr to 1984
1440	1	1984	600	Active Pivot Irrigation (1984), Changed First Irr to 1984
1446	1	1984	500	Active Pivot Irrigation (1984), Changed First Irr to 1984
1402	2	1940	725	Added minimum well completion date = 1940 from NPNRD
1069	3	1955	367	Added minimum well completion date = 1955 from NPNRD. Missing Well Capacity, Set to 800 gpm.
1072	5	1955	330	Added minimum well completion date = 1955 from NPNRD. Missing Well Capacity, Set to 800 gpm.
1312	1	1961	1,000	Inactive Certificate, visually no irrigation in any snapshot year.
1434	2	1951	402	Inactive Certificate, visually no irrigation in any snapshot year.
1095	1	1991	800	Inactive Certificate, visually no irrigation in any snapshot year. Missing Well Capacity, Set to 800 gpm.
1239	5	1952	654	Inactive Certificate, visually no irrigation in any snapshot year. Missing Well Capacity, Set to 800 gpm.
1395	5	1984	660	Inactive Certificate, visually no irrigation in any snapshot year. Missing Well Capacity, Set to 800 gpm.
1087	7	1943	443	Inactive Irrigation (1953). Missing Well Capacity, Set to 800 gpm.
1088	7	1943	443	Inactive Irrigation (1953). Missing Well Capacity, Set to 800 gpm.
1256	7	1948	669	Inactive Irrigation (1953, 1975)
1257	7	1948	669	Inactive Irrigation (1953, 1975)
1258	7	1948	669	Inactive Irrigation (1953, 1975)
1062	4	1940	548	Inactive Irrigation (1953, 1975). Missing Well Capacity, Set to 800 gpm.
1063	4	1940	548	Inactive Irrigation (1953, 1975). Missing Well Capacity, Set to 800 gpm.
1091	6	1949	925	Inactive Irrigation (1953, 1975, 1984)
1061	4	1940	548	Inactive Irrigation (1953, 1975, 1984). Missing Well Capacity, Set to 800 gpm.
1064	4	1940	548	Inactive Irrigation (1953, 1975, 1984). Missing Well Capacity, Set to 800 gpm.
1094	6	1949	925	Inactive Irrigation (1953, 1975, 1984, 1993, 1997)
1001	2	1975	325	Inactive Irrigation (1975)
1019	2	1974	625	Inactive Irrigation (1975)

Certificate Number	Well Reg. # Count	First Irrigation Date	Average Pumping Capacity (gpm)	Comment/Revision
1022	6	1974	177	Inactive Irrigation (1975)
1033	30	1960	536	Inactive Irrigation (1975)
1034	30	1960	536	Inactive Irrigation (1975)
1035	30	1960	536	Inactive Irrigation (1975)
1057	7	1975	178	Inactive Irrigation (1975)
1073	2	1964	100	Inactive Irrigation (1975)
1084	2	1965	300	Inactive Irrigation (1975)
1132	2	1971	850	Inactive Irrigation (1975)
1134	1	1975	800	Inactive Irrigation (1975)
1158	1	1959	1,000	Inactive Irrigation (1975)
1180	3	1975	674	Inactive Irrigation (1975)
1206	2	1961	1,400	Inactive Irrigation (1975)
1212	1	1974	800	Inactive Irrigation (1975)
1215	1	1975	700	Inactive Irrigation (1975)
1216	1	1975	1,100	Inactive Irrigation (1975)
1217	1	1975	1,100	Inactive Irrigation (1975)
1218	1	1975	1,100	Inactive Irrigation (1975)
1221	1	1975	400	Inactive Irrigation (1975)
1283	1	1975	1,542	Inactive Irrigation (1975)
1285	1	1974	1,850	Inactive Irrigation (1975)
1310	2	1974	649	Inactive Irrigation (1975)
1328	1	1960	850	Inactive Irrigation (1975)
1356	3	1975	417	Inactive Irrigation (1975)
1365	3	1968	1,050	Inactive Irrigation (1975)
1369	3	1970	233	Inactive Irrigation (1975)
1370	1	1974	900	Inactive Irrigation (1975)
1372	1	1975	1,200	Inactive Irrigation (1975)
1387	1	1975	2,568	Inactive Irrigation (1975)
1390	1	1973	800	Inactive Irrigation (1975)
1391	1	1975	800	Inactive Irrigation (1975)
1411	6	1973	425	Inactive Irrigation (1975)
1412	6	1973	425	Inactive Irrigation (1975)
1419	1	1973	800	Inactive Irrigation (1975)
1040	9	1965	867	Inactive Irrigation (1975). Missing Well Capacity, Set to 800 gpm.
1045	9	1965	867	Inactive Irrigation (1975). Missing Well Capacity, Set to 800 gpm.
1046	9	1965	867	Inactive Irrigation (1975). Missing Well Capacity, Set to 800 gpm.
1036	2	1967	677	Inactive Irrigation (1975, 1984)
1259	6	1968	328	Inactive Irrigation (1975, 1984, 1993)
1355	3	1975	417	Inactive Irrigation (1975, 1984, 1993, 1997)
1039	1	1979	765	Inactive Irrigation (1984)

Certificate Number	Well Reg. # Count	First Irrigation Date	Average Pumping Capacity (gpm)	Comment/Revision
1114	2	1993	550	Inactive Irrigation (1993)
1396	1	1991	800	Inactive Irrigation (1993, 1997)
1397	1	1991	1,000	Inactive Irrigation (1993, 1997)
1013	7	1966	761	Missing Well Capacity, Set to 800 gpm.
1014	7	1966	761	Missing Well Capacity, Set to 800 gpm.
1015	7	1966	761	Missing Well Capacity, Set to 800 gpm.
1041	9	1965	867	Missing Well Capacity, Set to 800 gpm.
1042	9	1965	867	Missing Well Capacity, Set to 800 gpm.
1043	9	1965	867	Missing Well Capacity, Set to 800 gpm.
1044	9	1965	867	Missing Well Capacity, Set to 800 gpm.
1052	1	1954	800	Missing Well Capacity, Set to 800 gpm.
1068	2	1966	800	Missing Well Capacity, Set to 800 gpm.
1083	2	1952	600	Missing Well Capacity, Set to 800 gpm.
1093	1	1991	800	Missing Well Capacity, Set to 800 gpm.
1202	1	1951	800	Missing Well Capacity, Set to 800 gpm.
1238	5	1952	654	Missing Well Capacity, Set to 800 gpm.
1240	5	1952	654	Missing Well Capacity, Set to 800 gpm.
1241	5	1952	654	Missing Well Capacity, Set to 800 gpm.
1242	5	1952	654	Missing Well Capacity, Set to 800 gpm.
1243	5	1952	654	Missing Well Capacity, Set to 800 gpm.
1244	9	1982	311	Missing Well Capacity, Set to 800 gpm.
1252	9	1982	311	Missing Well Capacity, Set to 800 gpm.
1335	1	1965	800	Missing Well Capacity, Set to 800 gpm.
1336	1	1965	800	Missing Well Capacity, Set to 800 gpm.
1337	1	1966	800	Missing Well Capacity, Set to 800 gpm.
1338	2	1958	1,300	Missing Well Capacity, Set to 800 gpm.
1339	1	1977	800	Missing Well Capacity, Set to 800 gpm.
1359	6	1928	628	Missing Well Capacity, Set to 800 gpm.
1393	2	1940	1,075	Missing Well Capacity, Set to 800 gpm.
1413	3	1950	850	Missing Well Capacity, Set to 800 gpm.
1443	1	1948	800	Missing Well Capacity, Set to 800 gpm.
1225	1	1996	15	No DNR Well Assignment, Not included in irrigated acreage assessment.
1332	1	1997	20	No DNR Well Assignment, Not included in irrigated acreage assessment.
1004	9	1998	33	Non-Irrigation Certificate, Not included in irrigated acreage assessment.
1005	7	2000	964	Non-Irrigation Certificate, Not included in irrigated acreage assessment.
1075	1	1981	300	Non-Irrigation Certificate, Not included in irrigated acreage assessment.
1096	1	2003	40	Non-Irrigation Certificate, Not included in irrigated acreage assessment.
1136	2	1978	12	Non-Irrigation Certificate, Not included in irrigated acreage assessment.

Certificate Number	Well Reg. # Count	First Irrigation Date	Average Pumping Capacity (gpm)	Comment/Revision
1145	1	1970	100	Non-Irrigation Certificate, Not included in irrigated acreage assessment.
1201	1	1961	350	Non-Irrigation Certificate, Not included in irrigated acreage assessment.
1314	1	1994	48	Non-Irrigation Certificate, Not included in irrigated acreage assessment.
1384	1	2000	120	Non-Irrigation Certificate, Not included in irrigated acreage assessment.
1409	1	1999	10	Non-Irrigation Certificate, Not included in irrigated acreage assessment.
1425	2	1969	638	Non-Irrigation Certificate, Not included in irrigated acreage assessment.
1231	6	1996	281	Non-Irrigation Certificate, Not included in irrigated acreage assessment. Missing Well Capacity, Set to 800 gpm.
1079	2	1938	837	Original Well drilled in 1938 Replaced in 1985. Inactive Irrigation (1953, 1975)
1118	2	1948	1,075	Original Well drilled in 1948 Replaced in 1998
1146	2	1948	1,075	Original Well drilled in 1948 Replaced in 1998
1187	3	1968	770	Two wells one 1972 one 1968
1188	3	1968	770	Two wells one 1972 one 1968
1284	3	1964	1,302	Two wells one drilled in 1964 and one drilled in 1969

Appendix B: South Platte Certified Acreage

WWUM Model Irrigated & Dryland Acreage Assessment

Appendix B – South Platte NRD Certified Acreage and Well Association Summary

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To accurately assess irrigated acreage and assign water sources, one of the first steps to completing the WWUM Model irrigated acreage assessment for the South Platte NRD was to complete an inventory of certified acreage and well information for the District. The inventory was completed to confirm that the available data sources could be used to accurately assign well attributes and develop a time series of wells assigned to "certified" irrigated acreage historically. Irrigated lands served by a ground water source, referred to herein as "certified parcels" or "certificates", reflect the amount of land served by one or more assigned well, and are assigned a unique certificate number to facilitate NRD management.

SPNRD Certified Acreage Inventory

Prior to the development of the irrigated acreage assessment, it was important to understand the accounting systems and databases that are maintained by the South Platte NRD, and how the information can be used to accurately represent historical irrigation in the South Platte NRD. On September 13, 2010, the South Platte NRD provided several geodatabases and shapefiles to be used as a starting point for the historical irrigated acreage assessments. The South Platte NRD Water Accounting geodatabase contained 998 irrigation certificates, representing over 134,800 acres of certified land or historically certified land within District.

An initial review of the data by LRE prompted a "Memorandum of Understanding (MOU)" to serve as the starting point of discussions with the SPNRD to fully understand the information that was provided. Specifically, the MOU was developed to better understand the types of acreage in the District, what information is important to maintain for modeling purposes, and how different data sources fit together. Conversations with the SPNRD resulted in the following coverages from their Water Accounting geodatabase to be used in the irrigated acreage assessment:

- SPNRD_CIA (876 certificates) - SPNRD Certified Irrigated Acreage that is currently active certified acreage maintained by the district.
- Out_of_System_CIA (84 certificates) - containing parcels without current allocations, or parcels that were historically active and may be active again the future.
- Transfers (19 certificates) – containing parcels where a portion of the parcel has been transferred to other uses, but were historically active.
- Retired_Tracts (19 certificates) – containing parcels that were historically active but are now retired.

South Platte Certified Acreage Attribute Review

A review of the attributes assigned to certified parcels in the South Platte NRD was necessary to identify the attributes important to maintain for modeling purposes and any data inconsistencies.

Table B1 contains a summary of the attributes from the original South Platte certified acreage coverage. The attributes that were maintained for the irrigated acreage assessment include certificate ID, irrigation method and the flag for surface water. Two attributes critical to the acreage

assessment efforts were not present in the SPNRD certified acreage coverage; first irrigation date and certification type. In the absence of a first irrigation date, the minimum well completion date from the DNR of the wells assigned to a certificate was used to provide an estimate of the year that the parcel was first irrigated. In the absence of a certification type attribute, the wells assigned to each certificate were assessed using the Nebraska DNR well database to determine the permitted use associated with the assigned wells. Certificates with wells permitted for non-irrigation uses (e.g. domestic, industrial) were reviewed using aerial imagery to confirm non-irrigation use. The remaining irrigated parcels represented the ground water only and co-mingled parcels in the SPNRD area.

Table B1: SPNRD Certified Acreage Attributes

Attribute	Description
ID	Certification number - a unique number assigned to each tract (multi-part polygon) certified for ground water use in the SPNRD, based on PLSS location of the parcel
Landowner	Name of landowner
OwnerID	Owner Number - this number corresponds to an owner record in the SPNRD database
Operator	Name of operator, if different than owner
OperatorID	Operator Number - this number corresponds to an operator record in the SPNRD database
Serial_Num	Flow-meter serial number
C_I_A	Certified Irrigated Acreage
Well_Reg	DNR well registration number
PoolingID	ID used for "pooled" or combined parcels
Subarea	Abbreviation for management sub-area
Comments	Text field used to capture SPNRD comments
SrfceRight	Surface water - a yes/no field. *Y* indicates that a tract also has surface water assigned as a source; also referred to as co-mingled tracts. *N* indicates the only source of water for this tract is ground water.
SW_Acres	Area in acres that can be served by surface water
HYPERLINK	Hyperlink field that opens the scanned certification (pdf) when activated in GIS at the SPNRD
Alias	Alternative certified parcel names
Irrigation_ Method	Method used to irrigated the parcels, includes pivot, gravity, or side roll
County	County parcel is located in
Appropriation	Indicates whether the parcel is in an area of fully or over appropriation
ProblemTract	True/False – indicates a problem with over or under usage of an allocation
Problem Description	Description of over or under usage of an allocation

South Platte NRD Certified Acreage Spatial Review

Based on the certified acreage inventory and understanding of the available data from the SPNRD Water Accounting geodatabase, a "Master SPNRD Certified Acreage Coverage" was compiled by combining the four coverages identified above. Appropriate attributes from each coverage were maintained and an additional field "Source" was added to track which coverage was the source. The original parcel boundaries in these coverages were generally based on 2005 imagery, therefore the 2005 NAIP imagery was used to spatially review the "Master SPNRD Certified Acreage Coverage" to review parcel boundaries and topology, identify overlapping polygons, and correct

certificate assignments. In general there were very few errors; topological issues were corrected and parcel boundaries were revised. The majority of the certificate assignment conflicts were between the retired and transferred certificates and were resolved with the help of the SPNRD. In total, there are 972 certificates accounted for in "Master SPNRD Certified Acreage Coverage" that was used as the basis of developing the SPNRD irrigated acreage assessment.

South Platte NRD Well Inventory

Using the Water Accounting geodatabase developed by the SPNRD, and the Nebraska Division of Natural Resources well databases, a time series of wells assigned to each certified parcel was developed based on Nebraska DNR well completion dates. The assignment of wells to each certificate provides the basis for developing when the certified parcels were first irrigated, and the active wells to assign in each irrigated acreage assessment year. Well capacity was also assigned from the DNR well database for modeling purposes. This memorandum describes the approach used to develop the relationship between certified acreage and wells, the development of well to certificate time series, and quality control processes used to confirm first irrigation dates, and well attributes.

The assignment of wells to each certified parcel in each assessment year was completed as a part of the WWUM Model irrigated acreage assessment. The assignment of well ID-to-parcel was a six step process:

1. The SPNRD manages the assignment of certificates-to-meters, and meters-to-DNR-registration number. The first step was to link the two tables based on meter ID and determine the one-to-many relationship between certificates and DNR registration number (Cert_Reg). This was a critical step to insure that all wells assigned to a certificate were accounted for correctly. Discrepancies were resolved with the help of the SPNRD.

2. Nebraska DNR well database was downloaded for all counties located in the SPNRD. This database contains all wells, including replacement wells, associated with a DNR registration number and additional attributes including well completion dates, replacement information, and well capacities.

3. A link between the DNR well database and the meter to DNR registration number confirms the SPNRD meters have valid assignments and well attributes from the DNR well database. Discrepancies were resolved with the help of the SPNRD.

4. Link the table developed in Step 3 to the certificate-to-meter table making sure to include the DNR well completion date, replacement information, and well capacities. Review well completion dates by DNR registration number making sure to track and assign any well replacement dates.

5. Develop a time series of well ID's assigned to each certificate based on DNR well completion dates accounting for replacement wells. Confirm well capacities and set any missing capacities to 800 gpm (NPNRD district average).

6. Associate the well assignments and minimum well completion dates to the "Master SPNRD Certified Acreage Coverage" by certificate.

At this point, wells have been assigned to certificates, and a time series of certificates has been developed. This time series of certificates provides a guide as to when certificates begin irrigating throughout the study period. Beginning in 2005, the certified acres were used to determine the irrigation activity throughout the District based on first irrigation/minimum well completion dates. For example, only certificates with a first irrigation date of 1953 to 1997 were included in the 1997 assessment.

SPNRD Comments and Revisions

Revisions and comments made to specific certificates in the South Platte NRD basin throughout the process described above were tracked and have been included in **Table B4,** attached at the end of this appendix. In total there are 972 certificates that were evaluated during the SPNRD irrigated acreage assessment.

Primary observations, comments, and revisions for South Platte Certificates include:

- All SP_CIA was accounted for in the assessments
- 6 Out of System certificates are inactive in all assessment years
- 39 certificates with missing well capacity information and set to the average well capacity of the District wells (800 gpm)
- 5 certificates were actively irrigating in 1953 based on a visual assessment; changed first irrigation date to 1953
- 11 certificates were actively irrigating in 1977 based on a visual assessment; changed first irrigation date to 1977
- 7 certificates were actively irrigating in 1984 based on a visual assessment; changed first irrigation date to 1984
- 3 certificates were actively irrigating in 1997 based on a visual assessment; changed first irrigation date to 1997
- 11 certificates had missing DNR well completion dates, based first irrigation on well registration dates

Well Assignment Results

In total, there are 1,142 registered wells assigned to 972 certificates in the SPNRD with a maximum of 7 wells assigned to one certificate. The earliest well completion date recorded by the Nebraska DNR that is assigned to a SPNRD certificate is in 1913, and the most recent was in 2006. **Figure B1** shows the cumulative certificate activity over time based on the minimum well completion dates.

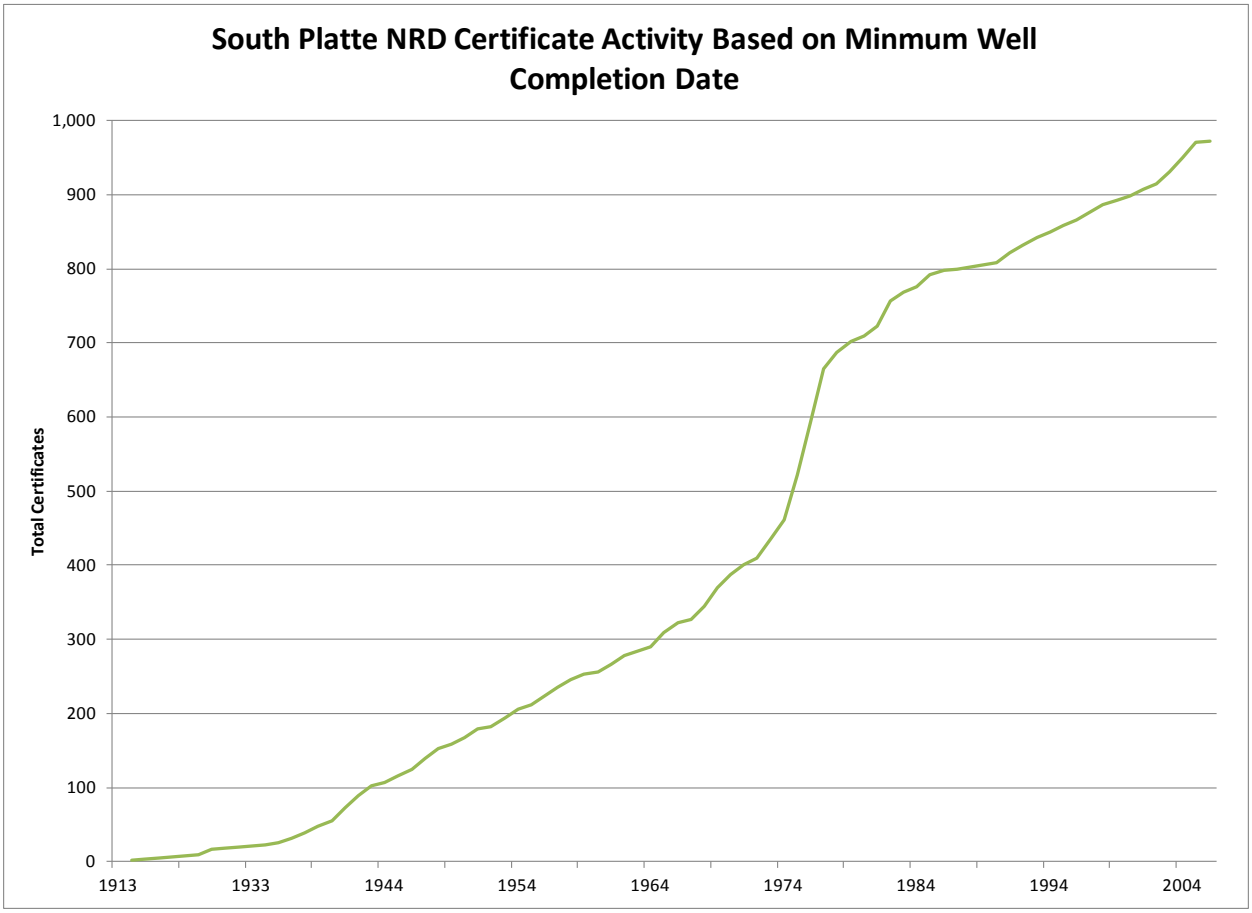


Figure B1: SPNRD Certified Activity

Inactive Pumping

Beginning in 2007, SPNRD began their meter reading program along Lodgepole Creek. In 2009, they began reading meters district wide. Meter readings are annual values of total water used and are recorded by certificate. When the meter readings are equal to zero, this is an indication of no water use (inactive pumping) on the assigned certified acreage during the year. Certificates located within Tablelands and along the South Platte Valley do not have water use data in 2007 and 2008. For these areas water use data from 2009 was used to indicate whether pumping occurred. Since there was no water use data for 2006, the certificates with inactive pumping in 2007 were carried back to 2006.

Certificates with inactive irrigation were removed from the WWUM Model irrigated acreage assessments beginning in 2006. **Table B2** summarizes the SPNRD acres removed from the irrigated acreage assessments as a result of inactive pumping and included in the dryland acreage assessments for 2006 through 2010.

Table B2: SPNRD Inactive Pumping Acreage Summary

Year	Total Inactive Pumping Acreage	Count of Certificates With Inactive Pumping
2006	3,624	46
2007	3,673	47
2008	3,708	47
2009	4,877	61
2010	4,614	62

Non-Certified Acreage

Non-certified acres are both sprinkler and flood irrigated lands clearly irrigated based on aerial imagery with no known water supply. The flood parcels that were identified are under the Petersen ditch service areas not represented in the model. Non-certified acres were assigned a first irrigation date based on the earliest assessment year that the parcel was identified. Non-certified certificates within the North Platte NRD were assigned certificate numbers 9950-9999, a corresponding well registration numbers (i.e. T-9950), and an average well capacity of 800 gpm. **Table B2** below summarizes non-certified acreage, and first irrigation dates assigned in the South Platte NRD.

Table B3: SPNRD Non-Certified Acreage Summary

Certificate #	9950	9951	9952	9953	9954	9955	9956	9957	9958	9959	Total (Ac)
Reg #	T-9950	T-9951	T-9952	T-9953	T-9954	T-9955	T-9956	T-9957	T-9958	T-9959	
First Irrigation Date	1953	1953	1977	1977	1977	1977	1984	1984	1984	1984	
Irrigation Type	Flood	Flood	Sprinkler	Sprinkler	Sprinkler	Sprinkler	Sprinkler	Flood	Sprinkler	Sprinkler	
1953 (Ac)	28	84	0	0	0	0	0	0	0	0	112
1977 (Ac)	28	84	30	102	85	133	0	0	0	0	461
1984 (Ac)	28	85	30	106	0	133	121	153	107	77	839
1993 (Ac)	28	85	30	0	0	138	0	153	0	0	434
1997 (Ac)	24	0	30	0	0	0	0	232	0	0	287
2001 (Ac)	24	0	30	0	0	0	0	232	0	0	287
2005 (Ac)	49	0	0	0	0	0	0	0	0	0	49
2010 (Ac)	40	0	0	0	0	0	0	0	0	0	40

Table B4: SPNRD Certified Acreage Comments and Revisions

Certificate Number	Source	First Irrig. Date	Well Reg. # Count	Average Pumping Capacity (gpm)	Comments/Revisions
12N42W020008	SPNRD_CIA	1959	1	1,200	DNR Well Completion Date Missing, Assigned Well Registration Date = 1959
12N42W030005	SPNRD_CIA	1958	1	1,200	DNR Well Completion Date Missing, Assigned Well Registration Date = 1958
12N42W050002	SPNRD_CIA	1959	1	1,300	DNR Well Completion Date Missing, Assigned Well Registration Date = 1959
12N42W080007	SPNRD_CIA	1976	1	1,000	Inactive Irrigation (1977)
12N42W100007	SPNRD_CIA	1958	2	750	DNR Well Completion Date Missing, Assigned Well Registration Date = 1958
12N42W130001	SPNRD_CIA	1973	1	1,742	Inactive Irrigation (1977)
12N42W140001	SPNRD_CIA	1956	1	800	Missing Well Capacity, Set to 800 gpm.
12N42W160003	SPNRD_CIA	2003	1	800	Missing Well Capacity, Set to 800 gpm.
12N42W170005	SPNRD_CIA	1968	1	1,092	Inactive Irrigation (1977-2001)
12N43W090001	SPNRD_CIA	1953	2	1,050	Visually Active Irrigation in 1953 (LRE), Changed First Irr to 1953.
12N43W130003	SPNRD_CIA	1946	1	1,000	12N43W130003 in 2010 has water use, but was also = western corner. Kept in coverage based on 2010 water use.
12N44W130001	SPNRD_CIA	1994	2	325	DNR Well Completion Date Missing, Assigned Well Registration Date = 1994
12N45W110005	SPNRD_CIA	1975	3	331	Inactive Irrigation (1977)
12N45W120002	SPNRD_CIA	1984	1	800	Visually Active Irrigation in 1984 (LRE), Changed First Irr to 1984. Missing Well Capacity, Set to 800 gpm.
12N49W010001	SPNRD_CIA	1973	1	800	Inactive Irrigation (1984-2001)
12N49W010002	SPNRD_CIA	1973	1	800	Inactive Irrigation (1984-2001)
12N50W150002	SPNRD_CIA	1993	1	480	Inactive Irrigation (1993-1997)
13N42W190001	SPNRD_CIA	1990	2	800	Missing Well Completion Date. Active irrigation in 1984, Set First Irrigation Date = 1984
13N42W290001	SPNRD_CIA	1977	1	1,542	Visually Active Irrigation in 1977 (LRE), Changed First Irr to 1977.
13N42W360003	SPNRD_CIA	1977	1	800	Visually Active Irrigation in 1977 (LRE), Changed First Irr to 1977. Missing Well Capacity, Set to 800 gpm.
13N44W150001	SPNRD_CIA	1976	1	700	Inactive Irrigation (1977)

Certificate Number	Source	First Irrig. Date	Well Reg. # Count	Average Pumping Capacity (gpm)	Comments/Revisions
13N44W170002	SPNRD_CIA	1977	1	800	Visually Active Irrigation in 1977 (LRE), Changed First Irr to 1977.
13N44W210001	SPNRD_CIA	1975	6	205	Inactive Irrigation (1977)
13N45W220003	SPNRD_CIA	1953	2	800	Visually Active Irrigation in 1953 (LRE), Changed First Irr to 1953.
13N45W260001	SPNRD_CIA	1948	1	800	Missing Well Capacity, Set to 800 gpm.
13N45W330002	SPNRD_CIA	1972	3	363	Inactive Irrigation (1977-2001)
13N46W060002	Out of System CIA	1962	1	400	Inactive Certificate, visually no irrigation in any snapshot year.
13N46W080002	SPNRD_CIA	1931	1	800	Missing Well Capacity, Set to 800 gpm.
13N47W140001	SPNRD_CIA	1993	1	500	Inactive Irrigation (1993)
13N47W170001	SPNRD_CIA	1944	1	800	Missing Well Capacity, Set to 800 gpm.
13N47W220001	SPNRD_CIA	1975	2	800	Inactive Irrigation (1997-2001)
13N48W060001	SPNRD_CIA	1957	1	650	Inactive Irrigation (1997-2005)
13N48W090001	Out of System CIA	1972	1	200	Inactive Certificate, visually no irrigation in any snapshot year.
13N50W020001	SPNRD_CIA	1953	2	1,500	Inactive Irrigation (1953)
13N50W040002	Retired_Tracts	1941	2	1,350	Inactive Irrigation (1953)
13N51W090001	SPNRD_CIA	1953	1	1,400	Visually Active Irrigation in 1953 (LRE), Changed First Irr to 1953.
13N51W160001	SPNRD_CIA	1975	1	1,400	Inactive Irrigation (1977-1993)
13N51W170001	SPNRD_CIA	1950	1	650	Inactive Irrigation (1953)
13N52W020002	SPNRD_CIA	1939	1	800	Missing Well Capacity, Set to 800 gpm.
13N57W220001	SPNRD_CIA	1987	1	700	Inactive Irrigation (1993-2001)
13N58W110001	SPNRD_CIA	1976	1	600	Inactive Irrigation (1977)
13N58W150001	SPNRD_CIA	1960	1	570	Inactive Irrigation (1977-2001)
14N43W030001	SPNRD_CIA	1975	1	723	Inactive Irrigation (1977)
14N43W100001	Out of System CIA	1974	1	700	Inactive Irrigation (2001)
14N46W050001	SPNRD_CIA	1993	1	1,200	Inactive Irrigation (1993)
14N47W140001	SPNRD_CIA	1976	2	462	Inactive Irrigation (1977-1997)
14N47W260002	Out of System CIA	1957	1	800	Inactive Certificate, visually no irrigation in any snapshot year.
14N47W260005	SPNRD_CIA	1943	1	800	Missing Well Capacity, Set to 800 gpm.
14N47W300002	SPNRD_CIA	1940	1	800	Missing Well Capacity, Set to 800 gpm.
14N47W310003	SPNRD_CIA	1944	1	800	Missing Well Capacity, Set to 800 gpm.
14N47W310005	SPNRD_CIA	1941	1	800	Missing Well Capacity, Set to 800 gpm.
14N47W340001	SPNRD_CIA	1942	1	800	Missing Well Capacity, Set to 800 gpm.
14N47W340003	SPNRD_CIA	1952	1	800	Missing Well Capacity, Set to 800 gpm.

Certificate Number	Source	First Irrig. Date	Well Reg. # Count	Average Pumping Capacity (gpm)	Comments/Revisions
14N47W360003	SPNRD_CIA	1955	1	800	Missing Well Capacity, Set to 800 gpm.
14N48W260004	SPNRD_CIA	1958	1	800	DNR Well Completion Date Missing, Assigned Well Registration Date = 1958
14N48W260005	SPNRD_CIA	1996	1	800	DNR Well Completion Date Missing, Assigned Well Registration Date = 1996
14N48W310001	SPNRD_CIA	1947	1	1,000	Inactive Irrigation (1953-1977)
14N48W320001	SPNRD_CIA	1976	2	200	Inactive Irrigation (1977)
14N49W050001	SPNRD_CIA	1984	1	800	Visually Active Irrigation in 1984 (LRE), Changed First Irr to 1984.
14N49W280001	Out of System CIA	1950	1	800	Inactive Certificate, visually no irrigation in any snapshot year. Missing Well Capacity, Set to 800 gpm.
14N49W340003	SPNRD_CIA	1984	1	250	Visually Active Irrigation in 1984 (LRE), Changed First Irr to 1984.
14N50W200004	SPNRD_CIA	1956	1	800	Missing Well Capacity, Set to 800 gpm.
14N50W200009	SPNRD_CIA	1977	1	1,000	Visually Active Irrigation in 1977 (LRE), Changed First Irr to 1977.
14N50W210001	SPNRD_CIA	1977	1	700	Visually Active Irrigation in 1977 (LRE), Changed First Irr to 1977.
14N50W340001	SPNRD_CIA	1984	1	500	DNR Well Completion Date Missing, Assigned Well Registration Date = 1994
14N51W120001	SPNRD_CIA	1947	1	1,200	Inactive Irrigation (1953-2005)
14N52W030006	Retired_Tracts	1943	1	800	Missing Well Capacity, Set to 800 gpm.
14N52W050002	SPNRD_CIA	1957	2	1,050	DNR Well Completion Date Missing, Assigned Well Registration Date = 1957
14N52W120001	SPNRD_CIA	1984	1	800	Missing Well Capacity, Set to 800 gpm.
14N54W220001	SPNRD_CIA	1955	1	800	Missing Well Capacity, Set to 800 gpm.
14N55W320001	SPNRD_CIA	1976	1	500	Inactive Irrigation (1993-1997)
14N56W060001	SPNRD_CIA	1977	1	750	Visually Active Irrigation in 1977 (LRE), Changed First Irr to 1977.
14N56W160001	SPNRD_CIA	1974	3	483	Inactive Irrigation (1977-1997)
14N57W340001	SPNRD_CIA	1938	1	1,000	Inactive Irrigation (1953-2001)
14N59W120009	Retired_Tracts	1976	2	950	Inactive Irrigation (1984-1997)
15N51W210003	SPNRD_CIA	1984	1	800	Visually Active Irrigation in 1984 (LRE), Changed First Irr to 1984.
15N53W300002	SPNRD_CIA	1977	1	560	Visually Active Irrigation in 1977 (LRE), Changed First Irr to 1977.
15N53W310001	SPNRD_CIA	1997	1	600	Visually Active Irrigation in 1997 (LRE), Changed First Irr to 1997.
15N54W110001	SPNRD_CIA	2003	1	800	Missing Well Capacity, Set to 800 gpm.

Certificate Number	Source	First Irrig. Date	Well Reg. # Count	Average Pumping Capacity (gpm)	Comments/Revisions
15N54W250002	SPNRD_CIA	1979	1	1,000	Inactive Irrigation (1984-1997)
15N54W250003	SPNRD_CIA	1950	2	750	Inactive Irrigation (1953-1997)
15N54W260002	Out of System CIA	1950	1	800	Missing Well Capacity, Set to 800 gpm.
15N54W270001	SPNRD_CIA	1976	1	1,000	DNR Well Completion Date Missing, Assigned Well Registration Date = 1976
15N54W300003	SPNRD_CIA	1984	1	800	Visually Active Irrigation in 1984 (LRE), Changed First Irr to 1984.
15N54W360009	SPNRD_CIA	1945	1	950	Inactive Irrigation after 1984
15N55W060005	SPNRD_CIA	2003	1	800	Missing Well Capacity, Set to 800 gpm.
15N55W090001	SPNRD_CIA	2004	1	1,300	Inactive Irrigation (2005)
15N55W140001	Out of System CIA	1961	1	100	Inactive Certificate, visually no irrigation in any snapshot year.
15N55W200006	SPNRD_CIA	1977	1	200	Visually Active Irrigation in 1977 (LRE), Changed First Irr to 1977.
15N55W340001	SPNRD_CIA	2001	1	850	Missing Well Completion Date. Active irrigation in 1997, Set First Irrigation Date = 1997
15N55W350002	SPNRD_CIA	1977	1	650	Visually Active Irrigation in 1977 (LRE), Changed First Irr to 1977.
15N55W350003	SPNRD_CIA	1977	1	750	Visually Active Irrigation in 1977 (LRE), Changed First Irr to 1977.
15N56W050001	SPNRD_CIA	2004	1	750	Inactive Irrigation (2005)
15N56W250001	SPNRD_CIA	1984	1	800	Missing Well Capacity, Set to 800 gpm.
15N56W250002	SPNRD_CIA	1975	1	225	Inactive Irrigation (1997-2005)
15N56W280002	SPNRD_CIA	1937	1	800	Missing Well Capacity, Set to 800 gpm.
15N56W290002	SPNRD_CIA	1952	1	800	Missing Well Capacity, Set to 800 gpm.
15N56W290003	SPNRD_CIA	1952	1	800	Missing Well Capacity, Set to 800 gpm.
15N56W290008	SPNRD_CIA	1946	1	800	Inactive Irrigation (1953), Missing Well Capacity, Set to 800 gpm.
15N56W310001	SPNRD_CIA	1952	1	800	Missing Well Capacity, Set to 800 gpm.
15N56W310003	SPNRD_CIA	1952	1	800	Missing Well Capacity, Set to 800 gpm.
15N56W310004	SPNRD_CIA	1941	1	800	Missing Well Capacity, Set to 800 gpm.
15N56W310009	SPNRD_CIA	1952	1	800	Missing Well Capacity, Set to 800 gpm.
15N56W320001	SPNRD_CIA	1941	1	800	Missing Well Capacity, Set to 800 gpm.
15N56W320002	SPNRD_CIA	1941	1	800	Missing Well Capacity, Set to 800 gpm.
15N56W320003	SPNRD_CIA	1953	1	925	Visually Active Irrigation in 1953 (LRE), Changed First Irr to 1953.
15N56W320004	SPNRD_CIA	1941	1	800	Missing Well Capacity, Set to 800

Certificate Number	Source	First Irrig. Date	Well Reg. # Count	Average Pumping Capacity (gpm)	Comments/Revisions
					gpm.
15N57W260009	SPNRD_CIA	1962	2	400	DNR Well Completion Date Missing, Assigned Well Registration Date = 1962
15N57W310001	SPNRD_CIA	1976	1	460	Inactive Irrigation (1977)
15N57W360001	Retired_Tracts	1937	1	800	Missing Well Capacity, Set to 800 gpm.
15N58W020001	SPNRD_CIA	1984	1	600	Visually Active Irrigation in 1984 (LRE), Changed First Irr to 1984.
16N51W320001	SPNRD_CIA	1997	1	800	Visually Active Irrigation in 1997 (LRE), Changed First Irr to 1997.
16N52W190004	Transfers	1992	1	750	Transfer ID 16N52W190004 removed. Used SPCIA ID 16N52W190001 represents Id for complete POR.
16N52W220001	SPNRD_CIA	1988	1	800	Missing Well Capacity, Set to 800 gpm.
16N54W060001	SPNRD_CIA	1953	1	1,250	Visually Active Irrigation in 1953 (LRE), Changed First Irr to 1953.
16N54W150001	SPNRD_CIA	1996	1	800	Missing Well Capacity, Set to 800 gpm.
16N54W320003	SPNRD_CIA	1974	1	700	Inactive Irrigation (1977-1993)
16N56W110001	SPNRD_CIA	2003	1	800	Missing Well Capacity, Set to 800 gpm.
16N56W330002	SPNRD_CIA	1977	1	700	Visually Active Irrigation in 1977 (LRE), Changed First Irr to 1977.

Appendix C: Crop Assignments

WWUM Model Irrigated & Dryland Acreage Assessment

Appendix C – Crop Assignments

The assignment of crop types to irrigated and dryland acreage is necessary to determine the net irrigation requirement (NIR) for the acreage in Wyoming, and the North Platte and South Platte NRD areas in Nebraska. The estimation of NIR for both irrigated and dryland crops is an important component in determining water usage and recharge in the WWUM Model. An investigation of available tabular and spatial cropping data, as well as recommendations as to which cropping information should be used in the acreage assessment, was completed as a part of the *Irrigated Acreage Assessment Approach, June 2010* memorandum. In general, the more recent spatial crop information is available for a given assessment year only. More historical information, was generally tabular and was used for assessment years as well as the years in between. The recommendations from the report were generally accepted by the NRDs; additional sources of information due to an expansion in the study period and area were also considered.

In order for the user to determine which information was used for a parcel in any given year, a series of flags was included as an attribute (CRP_SRC) in both the NRD coverages. **Table 1** summarizes the crop flags and associated crop information source. The final sources of cropping information were applied to the acreage assessments based on the algorithms discussed below.

Table 1: Crop Information Flag Descriptions

Flag (CRP_SRC)	Crop Information Source/Description
1	Spatial crop information provided by North Platte or South Platte NRD assigned for the specified year (e.g. North Platte NRD 2009 crop information assigned in the 2009 coverage)
2	Spatial crop information based on 2010 CALMIT points
3	Spatial crop information based on 2010 CropScape Landuse grid
4	Spatial crop information provided by North Platte or South Platte NRD assigned to a proximate year (e.g. North Platte NRD 2009 crop information assigned in the 2008 coverage)
5	Spatial crop information based on 2005 CALMIT Landuse grid
6	Spatial crop information based on 2001 CALMIT Landuse grid
7	Spatial crop information based on 1997 CALMIT Landuse grid
8	Tabular crop information from Dr. Martin Report
9	Tabular crop information from County Agricultural Statistics
10	User-supplied crop information

USDA CropScape and NRD Crop Assignments (2010)

Three sources of spatial crop information were available for the 2010 acreage assessment and used to assign crops to irrigated parcels in the North Platte and South Platte NRD areas:

1. Crop points for certified parcels gathered by the North Platte and South Platte NRDs
2. Crop points on non-certified fields developed by CALMIT
3. CropScape land use grid coverage developed by the USDA National Agriculture Statistics Service.

The certificate and field-specific assignments from the NRDs and CALMIT were applied first, then, if a crop was not assigned, an algorithm was used to assign a maximum of four crops from the 2010 CropScape grid to the remaining parcels.

NRD Crop Points

Both the North Platte and South Platte NRDs provided a spatial coverage of points or polygons with recent crop information. Specifically, the North Platte NRD collected crop information on select certified parcels along the North Platte River and Pumpkin Creek for the 2009 and 2010 growing season. The South Platte collected crop information on select certified parcels along Lodgepole Creek for 2006 through 2010 and for select parcels NRD-wide in 2009 and 2010.

Both NRDs spatial crop information included up to four crop types with corresponding crop percentages. The naming conventions of crop types were standardized to match the crop types used by CALMIT and the crop percentages were reviewed to ensure the percentages summed to 100 percent. Cropping information was assigned to the 2010 irrigated acreage coverage using either an intersect method or based on certificates. The North Platte NRD crop information was provided in a point format, therefore the crop coverage for this NRD was intersected with the 2010 irrigated acreage coverage. The intersected parcel was then assigned with the NRD crop information from the point coverage. The South Platte NRD crop information was provided in a polygon format that assigned crops to a certificate. Therefore, the certificate number, instead of a spatial method, was used to assign the crop information to certified parcels in the South Platte NRD area.

CALMIT Crop Points

Field-specific crop information was collected through recent CALMIT land use efforts. Specifically, a spatial coverage of points indicating crop information for select dryland and irrigated parcels in the North Platte NRD area were collected. A single crop type was assigned to each point and the naming conventions of crop types were standardized to match the 2005 CALMIT crops names. The CALMIT crop coverage was intersected with the 2010 irrigated acreage coverage and the intersected parcel was assigned with the CALMIT crop information.

CropScape

CropScape is a web-based viewer developed by the National Agricultural Statistics Service (NASS) to provide access to spatial crop and land use information. A 2010 cropland data layer (CDL), or land use coverage, was developed by NASS for release in conjunction with the CropScape viewer. The 2010 CDL coverage was downloaded from the CropScape web viewer (nassgeodata.gmu.edu/CropScape/) for the North Platte and South Platte NRD areas. The North Platte NRD staff compared the 2010 CropScape CDL coverage to the NRD crop points to determine the relative accuracy of the coverage. It was determined that the 2010 CropScape data matched with greater than 80 percent of the NRD crop points; however did not correctly identify the sugar beet crop. Further analysis resulted in a trend whereby a parcel assigned to at least 50 percent sugar beets, was in reality, all sugar beets based on NRD crop point information. This trend was implemented during the re-classification, by assigning parcels with greater than 50 percent sugar beets to be all sugar beets.

The following algorithm was executed to use the CropScape information in the acreage assessment:

1. The CropScape CDL coverage was converted from a grid to a contiguous polygon shapefile, preserving the original land use classes.
2. The vector formatted land use coverages were then used directly to create both an irrigated and dryland land use coverage. Each of the coverages was then re-classified to standardize crop types to match the CALMIT crop types. **Table 2** summarizes the crop re-classifications; below is a summary of the major re-classifications.
    - Based on discussions with NRD personnel, both Sugar Beets and Potatoes were re-classified in the dryland coverage as Dry Beans.
    - Based on discussions with NRD personnel, all irrigated and dryland Soybeans were re-classified to Dry Beans.
    - Summer Fallow land use was reclassified as Grass Pasture in the irrigated land use coverage. For dryland coverage, Summer Fallow was explicitly assigned to the dryland acreage.
    - The CropScape CDL coverage includes several non-crop land uses, therefore it was necessary to limit the land use classes to crops that are actually grown in the NRD areas and re-classify non-crop classes. Non-crop types (e.g. roads, open water, etc) in the land use coverage were re-classified as Grass Pasture or Alfalfa with the understanding that only irrigated and dryland areas were delineated, and non-crop types are invalid in these areas.

Table 2: CropScape Re-classification of Land Use Classes

CropScape Land Use Class	WWUM Model Irrigated Class	WWUM Model Dryland Class
Corn	CORN	CORN
Sorghum	SORGHUM	SORGHUM
Soybeans	DRY_BEANS	DRY_BEANS
Sunflowers	SUNFLOWER	SUNFLOWER
Popcorn or Ornamental Corn	CORN	CORN
Barley	SMALL_GRAINS	SMALL_GRAINS
Spring Wheat	SMALL_GRAINS	SMALL_GRAINS
Winter Wheat	SMALL_GRAINS	SMALL_GRAINS
Other Small Grains	SMALL_GRAINS	SMALL_GRAINS
Rye	SMALL_GRAINS	SMALL_GRAINS
Oats	SMALL_GRAINS	SMALL_GRAINS
Millet	SMALL_GRAINS	SMALL_GRAINS
Canola	SMALL_GRAINS	SMALL_GRAINS
Alfalfa	ALFALFA	ALFALFA
Other Hays	GRASS_PASTURE	GRASS_PASTURE
Sugar Beets	SUGAR_BEETS	DRY_BEANS
Dry Beans	DRY_BEANS	DRY_BEANS
Potatoes	POTATOES	DRY_BEANS
Onions	POTATOES	DRY_BEANS
Peas	DRY_BEANS	DRY_BEANS

Seed/Sod Grass	GRASS_PASTURE	GRASS_PASTURE
Fallow/Idle Cropland	GRASS_PASTURE	SUMMER_FALLOW
NLCD - Open Water	ALFALFA	ALFALFA
NLCD - Developed/Open Space	GRASS_PASTURE	GRASS_PASTURE
NLCD - Developed/Low Intensity	GRASS_PASTURE	GRASS_PASTURE
NLCD - Developed/Medium Intensity	GRASS_PASTURE	GRASS_PASTURE
NLCD - Developed/High Intensity	GRASS_PASTURE	GRASS_PASTURE
NLCD - Barren	GRASS_PASTURE	GRASS_PASTURE
NLCD - Deciduous Forest	GRASS_PASTURE	GRASS_PASTURE
NLCD - Evergreen Forest	GRASS_PASTURE	GRASS_PASTURE
NLCD - Mixed Forest	GRASS_PASTURE	GRASS_PASTURE
NLCD - Shrubland	GRASS_PASTURE	GRASS_PASTURE
NLCD - Grassland Herbaceous	GRASS_PASTURE	GRASS_PASTURE
NLCD - Pasture/Hay	GRASS_PASTURE	GRASS_PASTURE
NLCD - Woody Wetlands	ALFALFA	ALFALFA
NLCD - Herbaceous Wetlands	ALFALFA	ALFALFA
Triticale	SMALL_GRAINS	SMALL_GRAINS
Vetch	GRASS_PASTURE	GRASS_PASTURE
Dbl. Crop WinWht/Corn	CORN	CORN
Cabbage	SUGAR_BEETS	DRY_BEANS

3. The irrigated and dryland acreage assessments were then intersected with the corresponding re-classified irrigated and dryland CropScape shapefiles, respectively. Parcels already assigned with crops from either the NRD or CALMIT points were excluded from this analysis. The intersection of acreage with the CropScape coverages provided a table with each unique Parcel ID/land use combination. This table was generated to allow for the summation of common crops in a parcel (i.e. two areas of Corn in a single parcel are summed tabularly) and the calculation of the percent of each parcel assigned to a specific crop.
4. The table of spatially assigned crops was imported into Excel and the land use classes were summarized by Parcel ID.
5. The area weights for each crop class in the parcel were calculated by dividing the crop class area in the parcel by the total area of the parcel. If the area weight of a crop class was less than 10 percent of the total parcel area, then the crop area was redistributed to the other crops in the parcel based on the area-weighting of each crop class.
6. Parcels were limited to a maximum of four crop classes. If more than four crops were assigned, the parcel boundary in the acreage shapefile was split based on crop boundaries and the algorithm was re-run. This iterative process limited parcels to a maximum of four crop classes.
7. If the sum of the crop weights assigned to a parcel were less than 1.0, generally due to rounding issues, the parcel crop distribution was normalized to 1.0. Therefore, each parcel has 100 percent of acreage assigned to a crop class.
8. The final crop assignments were summarized by Parcel ID and directly assigned to the irrigated and dryland parcels in the acreage shapefiles. The “CROP1” through “CROP4” are the attributes in the acreage shapefiles that contain the crop classes, and “CROP1_COV”

through "CROP4_COV" are the attributes that contain the portion of the parcel assigned to the crop class.

CALMIT/COHYST Crop Assignments (2005, 2001, 1997, 1993)

Spatial land use information, based on Landsat imagery, was developed by CALMIT for 2005, 2001, 1997 and 1982. Resolution and the information included in the land use coverages improved over time, and CALMIT estimated the overall accuracy of the 2005 land use coverage to be approximately 80 percent. Due to the spatial nature of the information and the availability for the entire NRD areas, this information was selected as the source for crop information for the 2005 through 1993 WWUM Model acreage assessments. The 1997 coverage was used for the 1993 WWUM Model assessment year; the 1982 coverage was not used due to resolution issues.

These land use coverages were considered during the parcel delineation process in an effort to create parcel boundaries that included optimally a single crop, or a minimal number of crops, in each parcel. A portion of the parcels could not be refined to a single crop; therefore it was necessary to develop an algorithm to assign multiple crops to a single parcel. The algorithm assigns four primary crop types, and their associated percent of the parcel area, to each parcel. The following algorithm was executed with the CALMIT Land Use coverages for the 2005, 2001, 1997, and 1993 acreage assessments.

1. The CALMIT Land Use Coverages were converted from a grid to a contiguous polygon shapefile for the North Platte and South Platte NRD boundaries, preserving the original land use classes.
2. The vector formatted land use coverages were then used directly to create both an irrigated and dryland land use coverage in each year. Each of the coverages was then re-classified to standardize naming conventions and limit the number of crop types used in the assessment. **Table 3** summarizes the crop re-classifications; below are a summary of the major re-classifications.
    - Based on discussions with NRD personnel, both Sugar Beets and Potatoes were re-classified in the dryland coverage as Dry Beans.
    - Based on discussions with NRD personnel, all irrigated and dryland Soybeans were re-classified to Dry Beans.
    - Summer Fallow land use was reclassified as Grass Pasture in the irrigated land use coverage. For dryland coverage, Summer Fallow was explicitly assigned to the dryland acreage.
    - The CALMIT Land Use coverage includes several non-crop land uses, therefore it was necessary to limit the land use classes to crops that are actually grown in the NRD areas and reassign non-crop classes. Non-crop types (e.g. roads, open water, etc) in the land use coverage were reclassified as Grass Pasture or Alfalfa with the understanding that only irrigated and dryland areas were delineated, and non-crop types are invalid in these areas.

Table 3: CALMIT Re-Classification of Land Use Classes

CALMIT Land Use Class	WWUM Model Irrigated Class	WWUM Model Dryland Class
No Data	No Data	No Data
Irrigated Corn	CORN	CORN
Irrigated Sugar Beets	SUGAR_BEETS	DRY_BEANS
Irrigated Soybeans	DRY_BEANS	DRY_BEANS
Irrigated Sorghum (Milo, Sudan)	SORGHUM	SORGHUM
Irrigated Dry Edible Beans	DRY_BEANS	DRY_BEANS
Irrigated Potatoes	POTATOES	DRY_BEANS
Irrigated Alfalfa	ALFALFA	ALFALFA
Irrigated Small Grains	SMALL_GRAINS	SMALL_GRAINS
Range, Pasture, Grass (Brome, Hay)	GRASS_PASTURE	GRASS_PASTURE
Urban Land	GRASS_PASTURE	GRASS_PASTURE
Open Water	ALFALFA	ALFALFA
Riparian Forest and Woodlands	GRASS_PASTURE	GRASS_PASTURE
Wetlands	ALFALFA	ALFALFA
Other Ag. Land (farmstead, feedlot)	GRASS_PASTURE	GRASS_PASTURE
Irrigated Sunflower	SUNFLOWER	SUNFLOWER
Summer Fallow	GRASS_PASTURE	SUMMER_FALLOW
Roads	GRASS_PASTURE	GRASS_PASTURE
Dryland Corn	CORN	CORN
Dryland Soybeans	DRY_BEANS	DRY_BEANS
Dryland Sorghum	SORGHUM	SORGHUM
Dryland Dry Edible Beans	DRY_BEANS	DRY_BEANS
Dryland Alfalfa	GRASS_PASTURE	GRASS_PASTURE
Dryland Small Grains	SMALL_GRAINS	SMALL_GRAINS
Dryland Sunflower	SUNFLOWER	SUNFLOWER
Dryland Sugar Beets	N/A	N/A
Dryland Potatoes	N/A	N/A
Barren	GRASS_PASTURE	GRASS_PASTURE

3. The irrigated acreage and dryland assessments were then intersected with the corresponding re-classified irrigated and dryland CALMIT shapefiles, respectively. The intersection of acreage with the CALMIT coverages provided a table with each unique Parcel ID/land use combination. This table was generated to allow for the summation of common crops in a parcel (i.e. two areas of Corn in a single parcel are summed tabularly) and the calculation of the percent of each parcel assigned to a specific crop. Note due to the spatial similarities and chronological proximity, the 1993 irrigate acreage assessment crop assignments are based on the 1997 CALMIT shapefiles.
4. The table of spatially assigned crops was imported into Excel and the original land use classes were summarized by Parcel ID.
5. The area weights for each crop class in the parcel were calculated by dividing the crop class area in the parcel by the total area of the parcel. If the area weight of a crop class was less

than 10 percent of the total parcel area, then the crop area was redistributed to the other crops in the parcel based on the area-weighting of each crop class.

6. Parcels were limited to a maximum of four crop classes. If more than four crops were assigned, the parcel boundary in the acreage shapefile was split based on crop boundaries and the algorithm was re-run. This iterative process limited parcels to a maximum of four crop classes.
7. If the sum of the crop weights assigned to a parcel were less than 1.0, generally due to rounding issues, the parcel crop distribution was normalized to 1.0. Therefore, each parcel has 100 percent of acreage assigned to a crop class.
8. The final crop assignments were summarized by Parcel ID and directly assigned to the irrigated and dryland parcels in the acreage shapefiles. The "CROP1" through "CROP4" are the attributes in the acreage shapefiles that contain the crop classes and "CROP1_COV" through "CROP4_COV" are the attributes that contain the portion of the parcel assigned to the crop class.

Historical Crop Assignments (1984, 1977/1975, 1953)

Although spatial sources of historical cropping data were identified in the *Irrigated Acreage Assessment Approach* memorandum, including CALMIT coverages and National Land Cover Datasets, resolution and accuracy issues with the information limited their ability to be used in the crop assignment process. Tabular crop information, although difficult to distribute spatially, provides a more accurate indication of general cropping trends throughout the irrigation districts in the NRD areas. Ultimately, the NRDs decided on using multiple sources of tabular crop information to assign irrigated and dryland crops to the historical acreage assessments. Note that tabular information is generally available for both the assessment years, and all years in between the assessment years, year-specific crop information was applied to the 1984 through 1953 coverages.

North Platte NRD Area

The *Post-Decree Changes in the Water Supply and Irrigation Development in the North Platte River Valley* report by Dr. Derrel Martin (February, 2000) documents the changes to irrigated acreage in the North Platte River Valley over the period from 1946 through 1994. As noted in the report, the USBR-supplied irrigated crop types were the only historical crop type information available and that dryland crop assignments are not available from the USBR. USBR reported eight irrigated crops (corn, sugar beets, beans, potatoes, alfalfa, grass pasture, barley and oats) and their respective acreages under each irrigation district. This information was summarized by Dr. Martin resulting in an annual distribution of crops under each USBR-supplied district. Since only a portion of the irrigation districts in the North Platte River Valley receive USBR project water, historical crop information is only available for those USBR-supplied districts. Dr. Martin recommends using the cropping pattern from the closest USBR district for those districts with no crop data.

In order to use Dr. Martin's summarized crop percentages to assign historically irrigated crop patterns, the following two data adjustments were made.

1. The crop types of Barley and Oats were combined and included as Small Grains to be consistent with CALMIT crops.

2. The majority four crops were selected for each year, and each of the four crop percentages were proportionately increased until the four crops summed to 100 percent for each year.

Once the data adjustments were made, the tabular historical crop distribution for each year was used to make historical crop assignments in the North Platte NRD area. In addition, NASS information was used to supplement Dr. Martin reported information for areas outside of the North Platte River Valley and for dryland parcels. The following discusses the approach to historical crop assignments, and **Figure 1** illustrates which source of information was used for the irrigated crop assignment in the North Platte NRD area.

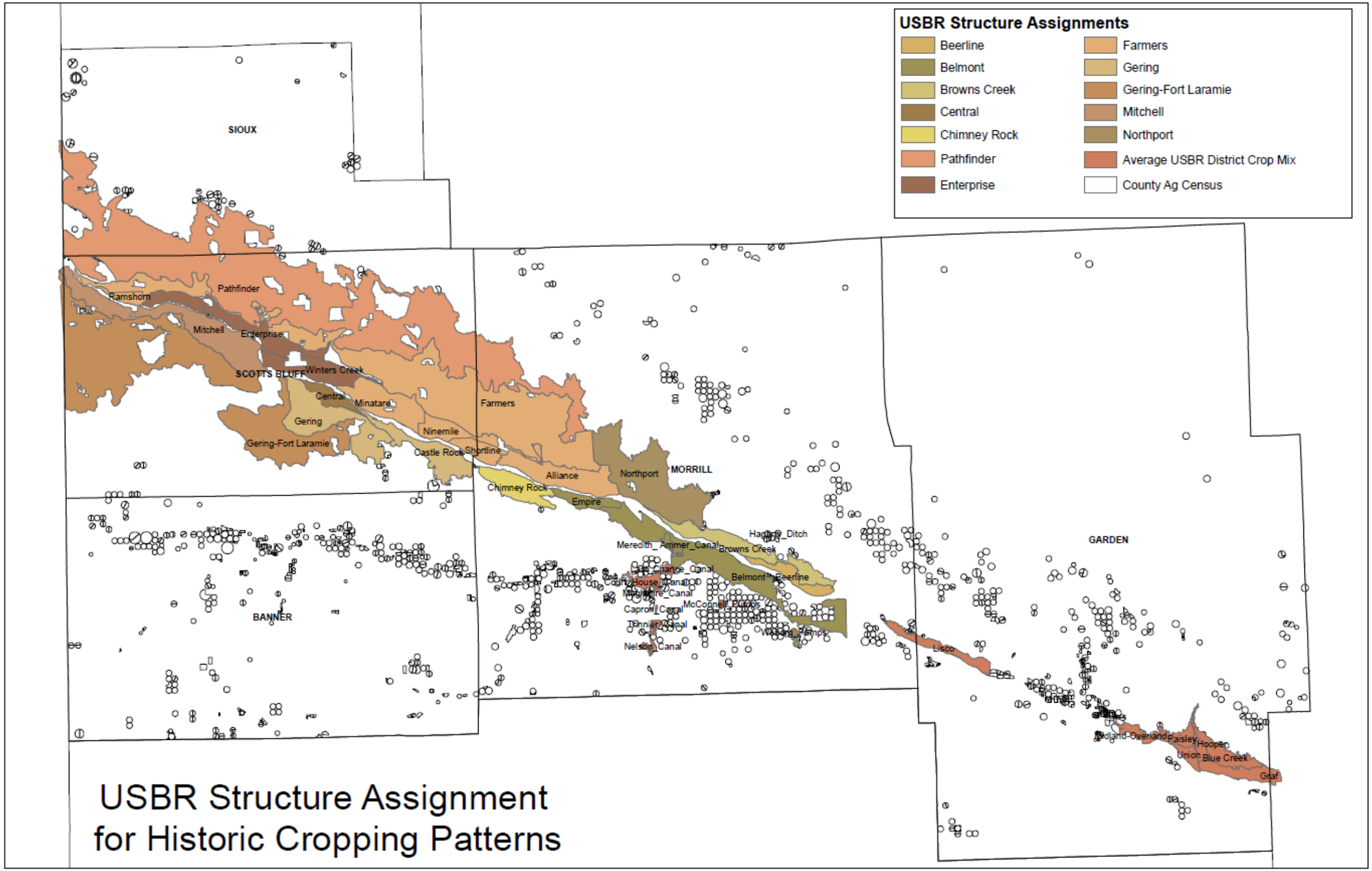
- *Irrigated Parcels under USBR-Districts in the North Platte River Valley*: The adjusted data was used directly for each district, assigning all parcels under each irrigation district with the same crop distribution for each year. See **Tables 4** through **16** for the annual irrigated crop distribution by USBR district used for the North Platte NRD.

- *Irrigated Parcels under Non-USBR-Districts in the North Platte River Valley*: Per Dr. Martin's recommendation, the adjusted data from the closest USBR-District was used, assigning all parcels under each non-USBR district with the same crop distribution for each year.

- *Irrigated Parcels in Pumpkin Creek and outside of the North Platte River Valley:* The majority four irrigated crops from each county were assigned based on historical NASS information. NASS information was provided by the Nebraska Division of Water Resources, and already re-classified to represent CALMIT crop types. See **Tables 17** through **21**for the annual irrigated crop distributions used for the North Platte NRD.

- *Dryland Parcels in the North Platte NRD Area:* The majority four dryland crops, including percent of land fallowed for the season, from each county were assigned based on historical NASS information. Dryland parcels in a given county were assigned the same crop distribution for each year. See **Tables 22** through **26** for the annual dryland crop distributions used for the North Platte NRD.

Figure 1: USBR and Agricultural Statistic Information for Historical Irrigated Crop Types



South Platte NRD Area

Historical NASS information was used to assign irrigated and dryland crop types, up to a maximum of four crops, in the South Platte NRD area. As discussed above, NASS information was provided by the Nebraska Division of Water Resources, and already re-classified to represent CALMIT crop types. See **Tables 27** through **32** for the annual irrigated and dryland crop distributions used for the South Platte NRD.

Interim Crop Assignments

As discussed above, the more recent spatial crop information is available for only assessment years, therefore it was necessary to estimate crops between assessment years. In general, crop assignments are carried forward for years in between each assessment year, however year-specific information was applied in specific cases. **Appendix D** discusses in more detail the process for developing the interim coverages and the process for carrying attributes through to the next assessment year. The more historical data (i.e. 1984 through 1953) discussed herein was available for all years and applied as such to the assessment and interim coverages.

Wyoming Crop Assignments

Irrigated acreage was developed for Wyoming as the basis for estimating consumptive use of water in Wyoming, which directly impacts the amount of water available to Nebraska in the North Platte River basin. Therefore, dryland parcels were not delineated for this area and tabular crop data was adequate in detail to estimate NIR in the Wyoming portion of the model study area. Wyoming irrigated parcels were assigned using information from the Wyoming Government Irrigation Districts crop summary (Table 2.32) in Dr. Martin's report for the 1953 through 1994 period. The crop distribution presented in this summary table was first limited to the four majority crops for each year. Note that the crop types of Oats and Barley were combined and included as Small Grains to be consistent with the crop types in Nebraska. The four majority crops were then summed for each year; if the sum of the crop weights was less than 1.0, the crop distribution was normalized to 1.0. The 1994 crop distribution was used for 1995 through 2010 due to lack of current cropping information from Dr. Martin's report. **Table 33** below summarizes the annual crop distribution applied to the Wyoming irrigated parcels.

The cropping information was externally processed and not explicitly included in Wyoming irrigated acreage coverage. This was mainly due to the fact that a single coverage was developed for the Wyoming lands, and it was difficult to append the time series of crop information to the single coverage. The same crop distribution, however, was used for all Wyoming parcels in a single year.

Table 4: USBR District Average Crop Mix in North Platte River Valley

Year	District	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Ave USBR Crop Mix	Sugar Beets	22%	Dry Beans	33%	Alfalfa	23%	Grass Pasture	22%
1954	Ave USBR Crop Mix	Corn	21%	Sugar Beets	22%	Dry Beans	33%	Alfalfa	23%
1955	Ave USBR Crop Mix	Corn	29%	Sugar Beets	19%	Dry Beans	32%	Alfalfa	20%
1956	Ave USBR Crop Mix	Corn	32%	Sugar Beets	22%	Dry Beans	25%	Alfalfa	21%
1957	Ave USBR Crop Mix	Corn	36%	Sugar Beets	20%	Dry Beans	24%	Alfalfa	20%
1958	Ave USBR Crop Mix	Corn	34%	Sugar Beets	21%	Dry Beans	27%	Alfalfa	19%
1959	Ave USBR Crop Mix	Corn	34%	Sugar Beets	21%	Dry Beans	27%	Alfalfa	18%
1960	Ave USBR Crop Mix	Corn	36%	Sugar Beets	22%	Dry Beans	26%	Alfalfa	16%
1961	Ave USBR Crop Mix	Corn	30%	Sugar Beets	24%	Dry Beans	27%	Alfalfa	18%
1962	Ave USBR Crop Mix	Corn	32%	Sugar Beets	22%	Dry Beans	27%	Alfalfa	18%
1963	Ave USBR Crop Mix	Corn	32%	Sugar Beets	24%	Dry Beans	25%	Alfalfa	19%
1964	Ave USBR Crop Mix	Corn	33%	Sugar Beets	24%	Dry Beans	25%	Alfalfa	18%
1965	Ave USBR Crop Mix	Corn	33%	Sugar Beets	22%	Dry Beans	26%	Alfalfa	19%
1966	Ave USBR Crop Mix	Corn	34%	Sugar Beets	22%	Dry Beans	26%	Alfalfa	18%
1967	Ave USBR Crop Mix	Corn	36%	Sugar Beets	21%	Dry Beans	25%	Alfalfa	18%
1968	Ave USBR Crop Mix	Corn	34%	Sugar Beets	22%	Dry Beans	27%	Alfalfa	17%
1969	Ave USBR Crop Mix	Corn	31%	Sugar Beets	22%	Dry Beans	30%	Alfalfa	17%
1970	Ave USBR Crop Mix	Corn	36%	Sugar Beets	21%	Dry Beans	27%	Alfalfa	16%
1971	Ave USBR Crop Mix	Corn	35%	Sugar Beets	22%	Dry Beans	26%	Alfalfa	17%
1972	Ave USBR Crop Mix	Corn	35%	Sugar Beets	22%	Dry Beans	27%	Alfalfa	16%
1973	Ave USBR Crop Mix	Corn	38%	Sugar Beets	19%	Dry Beans	28%	Alfalfa	15%
1974	Ave USBR Crop Mix	Corn	37%	Sugar Beets	20%	Dry Beans	29%	Alfalfa	14%
1975	Ave USBR Crop Mix	Corn	35%	Sugar Beets	22%	Dry Beans	28%	Alfalfa	14%
1976	Ave USBR Crop Mix	Corn	36%	Sugar Beets	21%	Dry Beans	28%	Alfalfa	15%
1977	Ave USBR Crop Mix	Corn	39%	Sugar Beets	19%	Dry Beans	28%	Alfalfa	14%
1978	Ave USBR Crop Mix	Corn	41%	Sugar Beets	18%	Dry Beans	27%	Alfalfa	13%
1979	Ave USBR Crop Mix	Corn	41%	Sugar Beets	19%	Dry Beans	26%	Alfalfa	13%
1980	Ave USBR Crop Mix	Corn	40%	Sugar Beets	20%	Dry Beans	28%	Grass Pasture	12%
1981	Ave USBR Crop Mix	Corn	39%	Sugar Beets	20%	Dry Beans	30%	Alfalfa	11%
1982	Ave USBR Crop Mix	Corn	42%	Sugar Beets	15%	Dry Beans	33%	Alfalfa	11%
1983	Ave USBR Crop Mix	Corn	48%	Sugar Beets	15%	Dry Beans	25%	Grass Pasture	11%
1984	Ave USBR Crop Mix	Corn	46%	Sugar Beets	16%	Dry Beans	26%	Alfalfa	11%
1985	Ave USBR Crop Mix	Corn	54%	Sugar Beets	14%	Dry Beans	22%	Alfalfa	10%
1986	Ave USBR Crop Mix	Corn	44%	Sugar Beets	15%	Dry Beans	27%	Alfalfa	14%
1987	Ave USBR Crop Mix	Corn	43%	Sugar Beets	16%	Dry Beans	28%	Alfalfa	13%
1988	Ave USBR Crop Mix	Corn	45%	Sugar Beets	16%	Dry Beans	26%	Alfalfa	13%
1989	Ave USBR Crop Mix	Corn	44%	Sugar Beets	17%	Dry Beans	26%	Alfalfa	14%
1990	Ave USBR Crop Mix	Corn	37%	Sugar Beets	18%	Dry Beans	31%	Alfalfa	14%
1991	Ave USBR Crop Mix	Corn	41%	Sugar Beets	20%	Dry Beans	27%	Alfalfa	12%
1992	Ave USBR Crop Mix	Corn	47%	Sugar Beets	19%	Dry Beans	23%	Grass Pasture	11%

Table 5: Beerline District Crop Mix

Year	District	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Beerline	Corn	9%	Alfalfa	11%	Grass Pasture	68%	Small Grains	11%
1954	Beerline	Corn	21%	Alfalfa	11%	Grass Pasture	60%	Small Grains	8%
1955	Beerline	Corn	22%	Alfalfa	11%	Grass Pasture	60%	Small Grains	8%
1956	Beerline	Corn	21%	Alfalfa	12%	Grass Pasture	58%	Small Grains	8%
1957	Beerline	Corn	22%	Alfalfa	11%	Grass Pasture	60%	Small Grains	8%
1958	Beerline	Corn	8%	Sugar Beets	4%	Alfalfa	20%	Grass Pasture	68%
1959	Beerline	Sugar Beets	3%	Alfalfa	10%	Grass Pasture	77%	Small Grains	10%
1960	Beerline	Sugar Beets	3%	Alfalfa	10%	Grass Pasture	77%	Small Grains	10%
1961	Beerline	Sugar Beets	3%	Alfalfa	10%	Grass Pasture	77%	Small Grains	10%
1962	Beerline	Corn	8%	Sugar Beets	4%	Alfalfa	20%	Grass Pasture	68%
1963	Beerline	Corn	9%	Sugar Beets	6%	Alfalfa	23%	Grass Pasture	62%
1964	Beerline	Corn	12%	Sugar Beets	6%	Alfalfa	22%	Grass Pasture	60%
1965	Beerline	Corn	4%	Alfalfa	28%	Grass Pasture	62%	Small Grains	6%
1966	Beerline	Corn	23%	Alfalfa	36%	Grass Pasture	39%	Small Grains	2%
1967	Beerline	Sugar Beets	2%	Alfalfa	30%	Grass Pasture	61%	Small Grains	7%
1968	Beerline	Corn	27%	Alfalfa	23%	Grass Pasture	44%	Small Grains	6%
1969	Beerline	Corn	17%	Dry Beans	5%	Alfalfa	22%	Grass Pasture	56%
1970	Beerline	Corn	19%	Dry Beans	5%	Alfalfa	24%	Grass Pasture	51%
1971	Beerline	Corn	8%	Alfalfa	23%	Grass Pasture	52%	Small Grains	17%
1972	Beerline	Corn	22%	Dry Beans	5%	Alfalfa	22%	Grass Pasture	51%
1973	Beerline	Corn	23%	Dry Beans	2%	Alfalfa	25%	Grass Pasture	49%
1974	Beerline	Corn	14%	Alfalfa	21%	Grass Pasture	62%	Small Grains	3%
1975	Beerline	Corn	10%	Sugar Beets	8%	Alfalfa	22%	Grass Pasture	60%
1976	Beerline	Corn	15%	Sugar Beets	8%	Alfalfa	20%	Grass Pasture	57%
1977	Beerline	Corn	16%	Sugar Beets	8%	Alfalfa	20%	Grass Pasture	55%
1978	Beerline	Corn	16%	Sugar Beets	6%	Alfalfa	20%	Grass Pasture	58%
1979	Beerline	Corn	18%	Sugar Beets	7%	Alfalfa	11%	Grass Pasture	63%
1980	Beerline	Corn	28%	Alfalfa	21%	Grass Pasture	49%	Small Grains	2%
1981	Beerline	Corn	33%	Alfalfa	10%	Grass Pasture	57%		
1982	Beerline	Corn	21%	Dry Beans	5%	Alfalfa	30%	Grass Pasture	44%
1983	Beerline	Corn	15%	Dry Beans	13%	Alfalfa	34%	Grass Pasture	37%
1984	Beerline	Corn	24%	Dry Beans	5%	Alfalfa	35%	Grass Pasture	35%
1985	Beerline	Corn	20%	Dry Beans	1%	Alfalfa	12%	Grass Pasture	67%
1986	Beerline	Corn	18%	Alfalfa	15%	Grass Pasture	68%		
1987	Beerline	Corn	26%	Alfalfa	37%	Grass Pasture	38%		
1988	Beerline	Corn	18%	Dry Beans	1%	Alfalfa	31%	Grass Pasture	50%
1989	Beerline	Corn	16%	Dry Beans	1%	Alfalfa	28%	Grass Pasture	56%
1990	Beerline	Corn	14%	Dry Beans	2%	Alfalfa	31%	Grass Pasture	53%
1991	Beerline	Corn	14%	Dry Beans	1%	Alfalfa	29%	Grass Pasture	56%
1992	Beerline	Corn	10%	Dry Beans	1%	Alfalfa	9%	Grass Pasture	80%

Table 6: Belmont District Crop Mix

Year	District	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Belmont	Sugar Beets	22%	Dry Beans	33%	Alfalfa	23%	Grass Pasture	22%
1954	Belmont	Corn	21%	Sugar Beets	22%	Dry Beans	33%	Alfalfa	23%
1955	Belmont	Corn	29%	Sugar Beets	19%	Dry Beans	32%	Alfalfa	20%
1956	Belmont	Corn	32%	Sugar Beets	22%	Dry Beans	25%	Alfalfa	21%
1957	Belmont	Corn	36%	Sugar Beets	20%	Dry Beans	24%	Alfalfa	20%
1958	Belmont	Corn	34%	Sugar Beets	21%	Dry Beans	27%	Alfalfa	19%
1959	Belmont	Corn	34%	Sugar Beets	21%	Dry Beans	27%	Alfalfa	18%
1960	Belmont	Corn	36%	Sugar Beets	22%	Dry Beans	26%	Alfalfa	16%
1961	Belmont	Corn	30%	Sugar Beets	24%	Dry Beans	27%	Alfalfa	18%
1962	Belmont	Corn	32%	Sugar Beets	22%	Dry Beans	27%	Alfalfa	18%
1963	Belmont	Corn	32%	Sugar Beets	24%	Dry Beans	25%	Alfalfa	19%
1964	Belmont	Corn	33%	Sugar Beets	24%	Dry Beans	25%	Alfalfa	18%
1965	Belmont	Corn	33%	Sugar Beets	22%	Dry Beans	26%	Alfalfa	19%
1966	Belmont	Corn	34%	Sugar Beets	22%	Dry Beans	26%	Alfalfa	18%
1967	Belmont	Corn	36%	Sugar Beets	21%	Dry Beans	25%	Alfalfa	18%
1968	Belmont	Corn	34%	Sugar Beets	22%	Dry Beans	27%	Alfalfa	17%
1969	Belmont	Corn	31%	Sugar Beets	22%	Dry Beans	30%	Alfalfa	17%
1970	Belmont	Corn	36%	Sugar Beets	21%	Dry Beans	27%	Alfalfa	16%
1971	Belmont	Corn	35%	Sugar Beets	22%	Dry Beans	26%	Alfalfa	17%
1972	Belmont	Corn	35%	Sugar Beets	22%	Dry Beans	27%	Alfalfa	16%
1973	Belmont	Corn	38%	Sugar Beets	19%	Dry Beans	28%	Alfalfa	15%
1974	Belmont	Corn	37%	Sugar Beets	20%	Dry Beans	29%	Alfalfa	14%
1975	Belmont	Corn	35%	Sugar Beets	22%	Dry Beans	28%	Alfalfa	14%
1976	Belmont	Corn	30%	Sugar Beets	24%	Dry Beans	24%	Grass Pasture	21%
1977	Belmont	Corn	50%	Sugar Beets	19%	Dry Beans	18%	Alfalfa	13%
1978	Belmont	Corn	53%	Sugar Beets	14%	Dry Beans	19%	Alfalfa	14%
1979	Belmont	Corn	60%	Sugar Beets	6%	Dry Beans	9%	Alfalfa	25%
1980	Belmont	Corn	35%	Sugar Beets	29%	Dry Beans	23%	Grass Pasture	13%
1981	Belmont	Corn	49%	Sugar Beets	9%	Dry Beans	29%	Alfalfa	13%
1982	Belmont	Corn	41%	Sugar Beets	20%	Dry Beans	27%	Alfalfa	12%
1983	Belmont	Corn	41%	Sugar Beets	20%	Dry Beans	27%	Alfalfa	12%
1984	Belmont	Corn	41%	Sugar Beets	20%	Dry Beans	27%	Alfalfa	12%
1985	Belmont	Corn	70%	Sugar Beets	4%	Alfalfa	15%	Grass Pasture	11%
1986	Belmont	Corn	63%	Dry Beans	10%	Alfalfa	14%	Grass Pasture	12%
1987	Belmont	Corn	59%	Dry Beans	11%	Alfalfa	17%	Grass Pasture	14%
1988	Belmont	Corn	59%	Dry Beans	11%	Alfalfa	17%	Grass Pasture	13%
1989	Belmont	Corn	55%	Dry Beans	12%	Alfalfa	17%	Grass Pasture	15%
1990	Belmont	Corn	55%	Sugar Beets	8%	Dry Beans	10%	Alfalfa	27%
1991	Belmont	Corn	60%	Dry Beans	14%	Alfalfa	26%	Grass Pasture	1%
1992	Belmont	Corn	60%	Dry Beans	14%	Alfalfa	26%	Grass Pasture	1%

Table 7: Browns Creek District Crop Mix

Year	District	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Browns Creek	Corn	10%	Alfalfa	14%	Grass Pasture	66%	Small Grains	10%
1954	Browns Creek	Corn	12%	Dry Beans	7%	Alfalfa	13%	Grass Pasture	69%
1955	Browns Creek	Corn	14%	Alfalfa	14%	Grass Pasture	64%	Small Grains	7%
1956	Browns Creek	Corn	13%	Sugar Beets	6%	Alfalfa	14%	Grass Pasture	67%
1957	Browns Creek	Corn	14%	Sugar Beets	7%	Alfalfa	14%	Grass Pasture	64%
1958	Browns Creek	Corn	15%	Sugar Beets	7%	Alfalfa	14%	Grass Pasture	64%
1959	Browns Creek	Corn	14%	Sugar Beets	7%	Alfalfa	14%	Grass Pasture	65%
1960	Browns Creek	Corn	20%	Sugar Beets	10%	Alfalfa	24%	Grass Pasture	47%
1961	Browns Creek	Corn	17%	Sugar Beets	8%	Alfalfa	29%	Grass Pasture	47%
1962	Browns Creek	Corn	13%	Dry Beans	3%	Alfalfa	24%	Grass Pasture	60%
1963	Browns Creek	Corn	12%	Dry Beans	6%	Alfalfa	24%	Grass Pasture	59%
1964	Browns Creek	Corn	18%	Dry Beans	6%	Alfalfa	27%	Grass Pasture	49%
1965	Browns Creek	Corn	18%	Dry Beans	6%	Alfalfa	27%	Grass Pasture	49%
1966	Browns Creek	Corn	20%	Dry Beans	6%	Alfalfa	25%	Grass Pasture	49%
1967	Browns Creek	Corn	19%	Dry Beans	7%	Alfalfa	26%	Grass Pasture	48%
1968	Browns Creek	Corn	18%	Dry Beans	17%	Alfalfa	19%	Grass Pasture	45%
1969	Browns Creek	Corn	23%	Dry Beans	21%	Alfalfa	15%	Grass Pasture	41%
1970	Browns Creek	Corn	26%	Dry Beans	12%	Alfalfa	17%	Grass Pasture	45%
1971	Browns Creek	Corn	29%	Dry Beans	14%	Alfalfa	17%	Grass Pasture	40%
1972	Browns Creek	Corn	29%	Dry Beans	13%	Alfalfa	23%	Grass Pasture	36%
1973	Browns Creek	Corn	29%	Dry Beans	10%	Alfalfa	22%	Grass Pasture	39%
1974	Browns Creek	Corn	30%	Dry Beans	11%	Alfalfa	22%	Grass Pasture	38%
1975	Browns Creek	Corn	29%	Dry Beans	11%	Alfalfa	22%	Grass Pasture	37%
1976	Browns Creek	Corn	39%	Dry Beans	7%	Alfalfa	20%	Grass Pasture	35%
1977	Browns Creek	Corn	51%	Dry Beans	8%	Alfalfa	24%	Grass Pasture	17%
1978	Browns Creek	Corn	52%	Dry Beans	8%	Alfalfa	23%	Grass Pasture	17%
1979	Browns Creek	Corn	50%	Dry Beans	8%	Alfalfa	23%	Grass Pasture	19%
1980	Browns Creek	Corn	45%	Dry Beans	13%	Alfalfa	23%	Grass Pasture	19%
1981	Browns Creek	Corn	45%	Dry Beans	13%	Alfalfa	22%	Grass Pasture	20%
1982	Browns Creek	Corn	50%	Dry Beans	12%	Alfalfa	25%	Grass Pasture	13%
1983	Browns Creek	Corn	51%	Dry Beans	11%	Alfalfa	19%	Grass Pasture	18%
1984	Browns Creek	Corn	49%	Dry Beans	19%	Alfalfa	19%	Grass Pasture	13%
1985	Browns Creek	Corn	49%	Dry Beans	19%	Alfalfa	19%	Grass Pasture	13%
1986	Browns Creek	Corn	40%	Dry Beans	13%	Alfalfa	37%	Grass Pasture	10%
1987	Browns Creek	Corn	37%	Dry Beans	13%	Alfalfa	37%	Grass Pasture	13%
1988	Browns Creek	Corn	41%	Dry Beans	12%	Alfalfa	33%	Grass Pasture	14%
1989	Browns Creek	Corn	40%	Dry Beans	13%	Alfalfa	37%	Grass Pasture	10%
1990	Browns Creek	Corn	36%	Dry Beans	13%	Alfalfa	38%	Grass Pasture	13%
1991	Browns Creek	Corn	35%	Dry Beans	14%	Alfalfa	38%	Grass Pasture	13%
1992	Browns Creek	Corn	36%	Dry Beans	13%	Alfalfa	38%	Grass Pasture	13%

Table 8: Central District Crop Mix

Year	District	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Central	Corn	20%	Sugar Beets	19%	Dry Beans	31%	Small Grains	31%
1954	Central	Corn	20%	Sugar Beets	19%	Dry Beans	31%	Small Grains	31%
1955	Central	Corn	25%	Dry Beans	27%	Potatoes	18%	Small Grains	30%
1956	Central	Corn	23%	Sugar Beets	20%	Dry Beans	31%	Small Grains	26%
1957	Central	Corn	23%	Sugar Beets	20%	Dry Beans	31%	Small Grains	26%
1958	Central	Corn	23%	Sugar Beets	20%	Dry Beans	31%	Small Grains	26%
1959	Central	Corn	32%	Sugar Beets	18%	Dry Beans	25%	Alfalfa	25%
1960	Central	Corn	32%	Sugar Beets	18%	Dry Beans	25%	Alfalfa	25%
1961	Central	Corn	32%	Sugar Beets	18%	Dry Beans	25%	Alfalfa	25%
1962	Central	Corn	32%	Sugar Beets	22%	Dry Beans	22%	Alfalfa	24%
1963	Central	Corn	32%	Sugar Beets	22%	Dry Beans	22%	Alfalfa	24%
1964	Central	Corn	32%	Sugar Beets	22%	Dry Beans	21%	Alfalfa	25%
1965	Central	Corn	28%	Sugar Beets	18%	Alfalfa	16%	Grass Pasture	38%
1966	Central	Corn	29%	Sugar Beets	20%	Alfalfa	17%	Grass Pasture	34%
1967	Central	Corn	30%	Sugar Beets	20%	Alfalfa	17%	Grass Pasture	33%
1968	Central	Corn	50%	Sugar Beets	17%	Dry Beans	13%	Alfalfa	20%
1969	Central	Corn	21%	Sugar Beets	19%	Alfalfa	23%	Small Grains	38%
1970	Central	Corn	40%	Sugar Beets	23%	Dry Beans	13%	Alfalfa	24%
1971	Central	Corn	42%	Sugar Beets	17%	Dry Beans	16%	Alfalfa	25%
1972	Central	Corn	40%	Sugar Beets	18%	Dry Beans	19%	Alfalfa	22%
1973	Central	Corn	40%	Sugar Beets	12%	Dry Beans	27%	Alfalfa	21%
1974	Central	Corn	39%	Sugar Beets	13%	Dry Beans	28%	Alfalfa	20%
1975	Central	Corn	40%	Sugar Beets	12%	Dry Beans	28%	Alfalfa	21%
1976	Central	Corn	33%	Sugar Beets	11%	Dry Beans	34%	Alfalfa	22%
1977	Central	Corn	31%	Sugar Beets	11%	Dry Beans	36%	Alfalfa	23%
1978	Central	Corn	29%	Dry Beans	37%	Alfalfa	20%	Grass Pasture	14%
1979	Central	Corn	31%	Sugar Beets	12%	Dry Beans	38%	Alfalfa	19%
1980	Central	Corn	30%	Sugar Beets	12%	Dry Beans	39%	Alfalfa	19%
1981	Central	Corn	31%	Sugar Beets	11%	Dry Beans	39%	Alfalfa	19%
1982	Central	Corn	30%	Sugar Beets	12%	Dry Beans	39%	Alfalfa	19%
1983	Central	Corn	30%	Sugar Beets	12%	Dry Beans	39%	Alfalfa	19%
1984	Central	Corn	36%	Sugar Beets	13%	Dry Beans	38%	Alfalfa	12%
1985	Central	Corn	36%	Sugar Beets	13%	Dry Beans	38%	Alfalfa	12%
1986	Central	Corn	36%	Sugar Beets	13%	Dry Beans	38%	Alfalfa	12%
1987	Central	Corn	34%	Dry Beans	39%	Alfalfa	14%	Grass Pasture	12%
1988	Central	Corn	36%	Sugar Beets	11%	Dry Beans	39%	Alfalfa	15%
1989	Central	Corn	37%	Sugar Beets	11%	Dry Beans	38%	Alfalfa	14%
1990	Central	Corn	39%	Sugar Beets	14%	Dry Beans	41%	Alfalfa	6%
1991	Central	Corn	30%	Sugar Beets	20%	Dry Beans	40%	Alfalfa	10%
1992	Central	Corn	30%	Sugar Beets	20%	Dry Beans	40%	Alfalfa	10%

Table 9: Chimney Rock District Crop Mix

Year	District	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Chimney Rock	Sugar Beets	11%	Alfalfa	13%	Grass Pasture	64%	Small Grains	13%
1954	Chimney Rock	Corn	11%	Dry Beans	11%	Alfalfa	15%	Grass Pasture	62%
1955	Chimney Rock	Corn	13%	Dry Beans	10%	Alfalfa	15%	Grass Pasture	62%
1956	Chimney Rock	Corn	14%	Dry Beans	10%	Alfalfa	15%	Grass Pasture	61%
1957	Chimney Rock	Corn	12%	Dry Beans	11%	Alfalfa	15%	Grass Pasture	62%
1958	Chimney Rock	Corn	13%	Dry Beans	10%	Alfalfa	15%	Grass Pasture	62%
1959	Chimney Rock	Corn	18%	Dry Beans	15%	Alfalfa	22%	Grass Pasture	45%
1960	Chimney Rock	Corn	18%	Dry Beans	16%	Alfalfa	22%	Grass Pasture	44%
1961	Chimney Rock	Corn	19%	Sugar Beets	16%	Alfalfa	21%	Grass Pasture	44%
1962	Chimney Rock	Corn	22%	Sugar Beets	15%	Alfalfa	26%	Grass Pasture	37%
1963	Chimney Rock	Corn	19%	Sugar Beets	13%	Alfalfa	23%	Grass Pasture	45%
1964	Chimney Rock	Corn	18%	Sugar Beets	15%	Alfalfa	23%	Grass Pasture	44%
1965	Chimney Rock	Corn	19%	Sugar Beets	14%	Alfalfa	23%	Grass Pasture	44%
1966	Chimney Rock	Corn	19%	Sugar Beets	14%	Alfalfa	23%	Grass Pasture	44%
1967	Chimney Rock	Corn	18%	Sugar Beets	14%	Alfalfa	23%	Grass Pasture	44%
1968	Chimney Rock	Corn	18%	Sugar Beets	15%	Alfalfa	23%	Grass Pasture	45%
1969	Chimney Rock	Sugar Beets	14%	Alfalfa	23%	Grass Pasture	47%	Small Grains	16%
1970	Chimney Rock	Corn	16%	Sugar Beets	15%	Alfalfa	23%	Grass Pasture	46%
1971	Chimney Rock	Corn	16%	Sugar Beets	15%	Alfalfa	23%	Grass Pasture	46%
1972	Chimney Rock	Corn	16%	Sugar Beets	15%	Alfalfa	23%	Grass Pasture	46%
1973	Chimney Rock	Corn	17%	Sugar Beets	15%	Alfalfa	23%	Grass Pasture	46%
1974	Chimney Rock	Corn	17%	Sugar Beets	15%	Alfalfa	22%	Grass Pasture	46%
1975	Chimney Rock	Corn	16%	Sugar Beets	15%	Alfalfa	23%	Grass Pasture	46%
1976	Chimney Rock	Corn	17%	Sugar Beets	14%	Alfalfa	23%	Grass Pasture	46%
1977	Chimney Rock	Corn	21%	Sugar Beets	14%	Alfalfa	21%	Grass Pasture	45%
1978	Chimney Rock	Corn	23%	Sugar Beets	13%	Alfalfa	19%	Grass Pasture	45%
1979	Chimney Rock	Corn	23%	Sugar Beets	13%	Alfalfa	19%	Grass Pasture	45%
1980	Chimney Rock	Corn	21%	Sugar Beets	15%	Alfalfa	19%	Grass Pasture	45%
1981	Chimney Rock	Corn	23%	Sugar Beets	15%	Alfalfa	17%	Grass Pasture	45%
1982	Chimney Rock	Corn	22%	Sugar Beets	15%	Alfalfa	18%	Grass Pasture	45%
1983	Chimney Rock	Corn	26%	Sugar Beets	15%	Alfalfa	15%	Grass Pasture	44%
1984	Chimney Rock	Corn	26%	Sugar Beets	15%	Alfalfa	15%	Grass Pasture	44%
1985	Chimney Rock	Corn	28%	Dry Beans	8%	Alfalfa	15%	Grass Pasture	49%
1986	Chimney Rock	Corn	32%	Dry Beans	9%	Alfalfa	18%	Grass Pasture	41%
1987	Chimney Rock	Corn	29%	Sugar Beets	13%	Alfalfa	16%	Grass Pasture	42%
1988	Chimney Rock	Corn	32%	Sugar Beets	11%	Alfalfa	19%	Grass Pasture	39%
1989	Chimney Rock	Corn	21%	Sugar Beets	9%	Alfalfa	20%	Grass Pasture	50%
1990	Chimney Rock	Corn	18%	Sugar Beets	11%	Alfalfa	15%	Grass Pasture	56%
1991	Chimney Rock	Corn	20%	Sugar Beets	10%	Alfalfa	14%	Grass Pasture	57%
1992	Chimney Rock	Corn	20%	Sugar Beets	10%	Alfalfa	14%	Grass Pasture	57%

Table 10: Enterprise District Crop Mix

Year	District	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Enterprise	Sugar Beets	25%	Dry Beans	25%	Alfalfa	24%	Grass Pasture	26%
1954	Enterprise	Sugar Beets	25%	Dry Beans	25%	Alfalfa	24%	Grass Pasture	26%
1955	Enterprise	Sugar Beets	25%	Dry Beans	25%	Alfalfa	24%	Grass Pasture	26%
1956	Enterprise	Sugar Beets	25%	Dry Beans	25%	Alfalfa	24%	Grass Pasture	26%
1957	Enterprise	Sugar Beets	25%	Dry Beans	25%	Alfalfa	24%	Grass Pasture	26%
1958	Enterprise	Corn	20%	Sugar Beets	13%	Dry Beans	17%	Grass Pasture	51%
1959	Enterprise	Corn	20%	Sugar Beets	15%	Dry Beans	18%	Grass Pasture	47%
1960	Enterprise	Corn	34%	Sugar Beets	25%	Dry Beans	30%	Potatoes	11%
1961	Enterprise	Corn	34%	Sugar Beets	24%	Dry Beans	31%	Potatoes	10%
1962	Enterprise	Corn	22%	Sugar Beets	13%	Dry Beans	18%	Grass Pasture	47%
1963	Enterprise	Corn	25%	Sugar Beets	15%	Dry Beans	19%	Grass Pasture	40%
1964	Enterprise	Corn	28%	Sugar Beets	18%	Dry Beans	20%	Grass Pasture	34%
1965	Enterprise	Corn	27%	Sugar Beets	17%	Dry Beans	21%	Grass Pasture	34%
1966	Enterprise	Corn	28%	Sugar Beets	21%	Dry Beans	19%	Grass Pasture	33%
1967	Enterprise	Corn	27%	Sugar Beets	18%	Dry Beans	23%	Grass Pasture	32%
1968	Enterprise	Corn	24%	Sugar Beets	20%	Dry Beans	23%	Grass Pasture	32%
1969	Enterprise	Corn	24%	Sugar Beets	20%	Dry Beans	23%	Grass Pasture	32%
1970	Enterprise	Corn	37%	Sugar Beets	23%	Dry Beans	25%	Alfalfa	16%
1971	Enterprise	Corn	40%	Sugar Beets	22%	Dry Beans	23%	Alfalfa	15%
1972	Enterprise	Corn	27%	Sugar Beets	38%	Dry Beans	22%	Alfalfa	13%
1973	Enterprise	Corn	27%	Sugar Beets	36%	Dry Beans	25%	Alfalfa	11%
1974	Enterprise	Corn	28%	Sugar Beets	33%	Dry Beans	29%	Alfalfa	10%
1975	Enterprise	Corn	22%	Sugar Beets	31%	Dry Beans	32%	Grass Pasture	15%
1976	Enterprise	Corn	21%	Sugar Beets	27%	Dry Beans	31%	Alfalfa	21%
1977	Enterprise	Corn	35%	Sugar Beets	26%	Dry Beans	27%	Alfalfa	11%
1978	Enterprise	Corn	36%	Sugar Beets	29%	Dry Beans	28%	Alfalfa	7%
1979	Enterprise	Corn	34%	Sugar Beets	28%	Dry Beans	27%	Alfalfa	12%
1980	Enterprise	Corn	35%	Sugar Beets	26%	Dry Beans	27%	Alfalfa	11%
1981	Enterprise	Corn	36%	Sugar Beets	24%	Dry Beans	29%	Alfalfa	11%
1982	Enterprise	Corn	39%	Sugar Beets	8%	Dry Beans	41%	Alfalfa	12%
1983	Enterprise	Corn	40%	Sugar Beets	8%	Dry Beans	40%	Alfalfa	12%
1984	Enterprise	Corn	41%	Sugar Beets	22%	Dry Beans	25%	Alfalfa	11%
1985	Enterprise	Corn	51%	Sugar Beets	19%	Dry Beans	16%	Alfalfa	14%
1986	Enterprise	Corn	55%	Sugar Beets	20%	Dry Beans	16%	Alfalfa	9%
1987	Enterprise	Corn	51%	Sugar Beets	19%	Dry Beans	19%	Alfalfa	11%
1988	Enterprise	Corn	52%	Sugar Beets	19%	Dry Beans	18%	Alfalfa	11%
1989	Enterprise	Corn	50%	Sugar Beets	19%	Dry Beans	20%	Alfalfa	11%
1990	Enterprise	Corn	47%	Sugar Beets	19%	Dry Beans	24%	Alfalfa	11%
1991	Enterprise	Corn	36%	Sugar Beets	31%	Dry Beans	26%	Alfalfa	7%
1992	Enterprise	Corn	55%	Sugar Beets	28%	Dry Beans	10%	Alfalfa	6%

Table 11: Farmers District Crop Mix

Year	District	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Farmers	Sugar Beets	24%	Dry Beans	37%	Grass Pasture	18%	Potatoes	21%
1954	Farmers	Sugar Beets	22%	Dry Beans	40%	Grass Pasture	18%	Potatoes	20%
1955	Farmers	Corn	22%	Sugar Beets	21%	Dry Beans	39%	Potatoes	19%
1956	Farmers	Corn	29%	Sugar Beets	28%	Dry Beans	29%	Grass Pasture	14%
1957	Farmers	Corn	37%	Sugar Beets	23%	Dry Beans	25%	Potatoes	15%
1958	Farmers	Corn	39%	Sugar Beets	23%	Dry Beans	25%	Grass Pasture	13%
1959	Farmers	Corn	39%	Sugar Beets	23%	Dry Beans	25%	Grass Pasture	13%
1960	Farmers	Corn	39%	Sugar Beets	24%	Dry Beans	24%	Grass Pasture	13%
1961	Farmers	Corn	39%	Sugar Beets	24%	Dry Beans	24%	Grass Pasture	13%
1962	Farmers	Corn	39%	Sugar Beets	22%	Dry Beans	26%	Grass Pasture	13%
1963	Farmers	Corn	38%	Sugar Beets	26%	Dry Beans	24%	Grass Pasture	12%
1964	Farmers	Corn	38%	Sugar Beets	26%	Dry Beans	24%	Grass Pasture	12%
1965	Farmers	Corn	39%	Sugar Beets	24%	Dry Beans	25%	Grass Pasture	12%
1966	Farmers	Corn	40%	Sugar Beets	25%	Dry Beans	24%	Grass Pasture	11%
1967	Farmers	Corn	39%	Sugar Beets	24%	Dry Beans	26%	Grass Pasture	11%
1968	Farmers	Corn	40%	Sugar Beets	25%	Dry Beans	24%	Grass Pasture	11%
1969	Farmers	Corn	39%	Sugar Beets	26%	Dry Beans	25%	Grass Pasture	11%
1970	Farmers	Corn	39%	Sugar Beets	25%	Dry Beans	25%	Grass Pasture	10%
1971	Farmers	Corn	42%	Sugar Beets	25%	Dry Beans	24%	Grass Pasture	10%
1972	Farmers	Corn	43%	Sugar Beets	23%	Dry Beans	25%	Grass Pasture	9%
1973	Farmers	Corn	43%	Sugar Beets	18%	Dry Beans	29%	Grass Pasture	9%
1974	Farmers	Corn	42%	Sugar Beets	18%	Dry Beans	31%	Grass Pasture	9%
1975	Farmers	Corn	39%	Sugar Beets	22%	Dry Beans	30%	Grass Pasture	9%
1976	Farmers	Corn	40%	Sugar Beets	20%	Dry Beans	32%	Grass Pasture	8%
1977	Farmers	Corn	40%	Sugar Beets	19%	Dry Beans	33%	Grass Pasture	8%
1978	Farmers	Corn	42%	Sugar Beets	20%	Dry Beans	29%	Grass Pasture	9%
1979	Farmers	Corn	42%	Sugar Beets	20%	Dry Beans	30%	Grass Pasture	9%
1980	Farmers	Corn	40%	Sugar Beets	21%	Dry Beans	30%	Grass Pasture	8%
1981	Farmers	Corn	42%	Sugar Beets	20%	Dry Beans	30%	Grass Pasture	8%
1982	Farmers	Corn	41%	Sugar Beets	19%	Dry Beans	37%	Alfalfa	3%
1983	Farmers	Corn	45%	Sugar Beets	15%	Dry Beans	37%	Alfalfa	3%
1984	Farmers	Corn	45%	Sugar Beets	15%	Dry Beans	37%	Alfalfa	3%
1985	Farmers	Corn	46%	Sugar Beets	15%	Dry Beans	36%	Alfalfa	3%
1986	Farmers	Corn	39%	Sugar Beets	12%	Dry Beans	38%	Alfalfa	11%
1987	Farmers	Corn	36%	Sugar Beets	17%	Dry Beans	32%	Alfalfa	15%
1988	Farmers	Corn	37%	Sugar Beets	12%	Dry Beans	39%	Alfalfa	11%
1989	Farmers	Corn	42%	Sugar Beets	18%	Dry Beans	34%	Alfalfa	6%
1990	Farmers	Corn	26%	Sugar Beets	16%	Dry Beans	54%	Alfalfa	4%
1991	Farmers	Corn	37%	Sugar Beets	25%	Dry Beans	32%	Alfalfa	5%
1992	Farmers	Corn	42%	Sugar Beets	21%	Dry Beans	31%	Alfalfa	5%

Table 12: Gering District Crop Mix

Year	District	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Gering	Sugar Beets	22%	Dry Beans	33%	Alfalfa	22%	Small Grains	23%
1954	Gering	Corn	26%	Sugar Beets	22%	Dry Beans	32%	Alfalfa	19%
1955	Gering	Corn	29%	Sugar Beets	19%	Dry Beans	30%	Alfalfa	22%
1956	Gering	Corn	34%	Sugar Beets	20%	Dry Beans	27%	Alfalfa	20%
1957	Gering	Corn	36%	Sugar Beets	19%	Dry Beans	25%	Alfalfa	19%
1958	Gering	Corn	30%	Sugar Beets	19%	Dry Beans	33%	Alfalfa	17%
1959	Gering	Corn	34%	Sugar Beets	21%	Dry Beans	31%	Alfalfa	14%
1960	Gering	Corn	35%	Sugar Beets	24%	Dry Beans	26%	Alfalfa	16%
1961	Gering	Corn	35%	Sugar Beets	20%	Dry Beans	27%	Alfalfa	17%
1962	Gering	Corn	33%	Sugar Beets	17%	Dry Beans	32%	Alfalfa	19%
1963	Gering	Corn	32%	Sugar Beets	22%	Dry Beans	27%	Alfalfa	18%
1964	Gering	Corn	33%	Sugar Beets	23%	Dry Beans	25%	Alfalfa	20%
1965	Gering	Corn	32%	Sugar Beets	20%	Dry Beans	28%	Alfalfa	20%
1966	Gering	Corn	35%	Sugar Beets	19%	Dry Beans	26%	Alfalfa	20%
1967	Gering	Corn	37%	Sugar Beets	19%	Dry Beans	24%	Alfalfa	20%
1968	Gering	Corn	31%	Sugar Beets	22%	Dry Beans	28%	Alfalfa	19%
1969	Gering	Corn	28%	Sugar Beets	23%	Dry Beans	32%	Alfalfa	18%
1970	Gering	Corn	34%	Sugar Beets	22%	Dry Beans	27%	Alfalfa	17%
1971	Gering	Corn	30%	Sugar Beets	23%	Dry Beans	28%	Alfalfa	19%
1972	Gering	Corn	35%	Sugar Beets	23%	Dry Beans	26%	Alfalfa	16%
1973	Gering	Corn	43%	Sugar Beets	19%	Dry Beans	25%	Alfalfa	13%
1974	Gering	Corn	43%	Sugar Beets	19%	Dry Beans	25%	Alfalfa	13%
1975	Gering	Corn	27%	Sugar Beets	25%	Dry Beans	30%	Alfalfa	18%
1976	Gering	Corn	30%	Sugar Beets	25%	Dry Beans	28%	Alfalfa	16%
1977	Gering	Corn	40%	Sugar Beets	18%	Dry Beans	23%	Alfalfa	18%
1978	Gering	Corn	39%	Sugar Beets	19%	Dry Beans	23%	Alfalfa	18%
1979	Gering	Corn	41%	Sugar Beets	19%	Dry Beans	21%	Alfalfa	19%
1980	Gering	Corn	31%	Sugar Beets	28%	Dry Beans	29%	Alfalfa	11%
1981	Gering	Corn	37%	Sugar Beets	27%	Dry Beans	25%	Alfalfa	11%
1982	Gering	Corn	34%	Sugar Beets	28%	Dry Beans	27%	Alfalfa	11%
1983	Gering	Corn	34%	Sugar Beets	28%	Dry Beans	27%	Alfalfa	11%
1984	Gering	Corn	47%	Sugar Beets	18%	Dry Beans	28%	Grass Pasture	8%
1985	Gering	Corn	49%	Sugar Beets	15%	Dry Beans	27%	Grass Pasture	8%
1986	Gering	Corn	42%	Sugar Beets	16%	Dry Beans	31%	Alfalfa	12%
1987	Gering	Corn	41%	Sugar Beets	15%	Dry Beans	34%	Alfalfa	10%
1988	Gering	Corn	40%	Sugar Beets	20%	Dry Beans	31%	Alfalfa	9%
1989	Gering	Corn	37%	Sugar Beets	21%	Dry Beans	35%	Alfalfa	8%
1990	Gering	Corn	37%	Sugar Beets	21%	Dry Beans	35%	Alfalfa	8%
1991	Gering	Corn	33%	Sugar Beets	28%	Dry Beans	33%	Alfalfa	6%
1992	Gering	Corn	38%	Sugar Beets	26%	Dry Beans	25%	Alfalfa	10%

Table 13: Gering-Fort Laramie District Crop Mix

Year	District	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Gering-Fort Laramie	Sugar Beets	25%	Dry Beans	30%	Alfalfa	23%	Small Grains	23%
1954	Gering-Fort Laramie	Corn	20%	Sugar Beets	29%	Dry Beans	27%	Alfalfa	25%
1955	Gering-Fort Laramie	Corn	27%	Sugar Beets	24%	Dry Beans	26%	Alfalfa	23%
1956	Gering-Fort Laramie	Corn	29%	Sugar Beets	26%	Dry Beans	20%	Alfalfa	26%
1957	Gering-Fort Laramie	Corn	32%	Sugar Beets	24%	Dry Beans	20%	Alfalfa	24%
1958	Gering-Fort Laramie	Corn	28%	Sugar Beets	26%	Dry Beans	25%	Alfalfa	21%
1959	Gering-Fort Laramie	Corn	29%	Sugar Beets	27%	Dry Beans	26%	Alfalfa	18%
1960	Gering-Fort Laramie	Corn	33%	Sugar Beets	27%	Dry Beans	24%	Alfalfa	17%
1961	Gering-Fort Laramie	Corn	27%	Sugar Beets	28%	Dry Beans	26%	Alfalfa	19%
1962	Gering-Fort Laramie	Corn	27%	Sugar Beets	28%	Dry Beans	26%	Alfalfa	20%
1963	Gering-Fort Laramie	Corn	27%	Sugar Beets	30%	Dry Beans	23%	Alfalfa	21%
1964	Gering-Fort Laramie	Corn	26%	Sugar Beets	30%	Dry Beans	26%	Alfalfa	18%
1965	Gering-Fort Laramie	Corn	26%	Sugar Beets	26%	Dry Beans	30%	Alfalfa	18%
1966	Gering-Fort Laramie	Corn	28%	Sugar Beets	27%	Dry Beans	29%	Alfalfa	17%
1967	Gering-Fort Laramie	Corn	30%	Sugar Beets	27%	Dry Beans	28%	Alfalfa	15%
1968	Gering-Fort Laramie	Corn	28%	Sugar Beets	28%	Dry Beans	29%	Alfalfa	15%
1969	Gering-Fort Laramie	Corn	24%	Sugar Beets	30%	Dry Beans	30%	Alfalfa	16%
1970	Gering-Fort Laramie	Corn	30%	Sugar Beets	25%	Dry Beans	27%	Alfalfa	19%
1971	Gering-Fort Laramie	Corn	29%	Sugar Beets	26%	Dry Beans	29%	Alfalfa	16%
1972	Gering-Fort Laramie	Corn	29%	Sugar Beets	29%	Dry Beans	26%	Alfalfa	16%
1973	Gering-Fort Laramie	Corn	29%	Sugar Beets	24%	Dry Beans	30%	Alfalfa	17%
1974	Gering-Fort Laramie	Corn	25%	Sugar Beets	29%	Dry Beans	31%	Alfalfa	14%
1975	Gering-Fort Laramie	Corn	26%	Sugar Beets	29%	Dry Beans	29%	Alfalfa	16%
1976	Gering-Fort Laramie	Corn	30%	Sugar Beets	28%	Dry Beans	28%	Alfalfa	15%
1977	Gering-Fort Laramie	Corn	33%	Sugar Beets	25%	Dry Beans	28%	Alfalfa	14%
1978	Gering-Fort Laramie	Corn	35%	Sugar Beets	23%	Dry Beans	28%	Alfalfa	15%
1979	Gering-Fort Laramie	Corn	33%	Sugar Beets	24%	Dry Beans	28%	Alfalfa	15%
1980	Gering-Fort Laramie	Corn	31%	Sugar Beets	27%	Dry Beans	29%	Alfalfa	13%
1981	Gering-Fort Laramie	Corn	33%	Sugar Beets	25%	Dry Beans	30%	Alfalfa	13%
1982	Gering-Fort Laramie	Corn	37%	Sugar Beets	19%	Dry Beans	33%	Alfalfa	11%
1983	Gering-Fort Laramie	Corn	49%	Sugar Beets	16%	Dry Beans	25%	Alfalfa	10%
1984	Gering-Fort Laramie	Corn	46%	Sugar Beets	20%	Dry Beans	24%	Alfalfa	10%
1985	Gering-Fort Laramie	Corn	51%	Sugar Beets	18%	Dry Beans	21%	Grass Pasture	10%
1986	Gering-Fort Laramie	Corn	37%	Sugar Beets	24%	Dry Beans	27%	Alfalfa	13%
1987	Gering-Fort Laramie	Corn	35%	Sugar Beets	26%	Dry Beans	28%	Alfalfa	10%
1988	Gering-Fort Laramie	Corn	40%	Sugar Beets	25%	Dry Beans	24%	Alfalfa	11%
1989	Gering-Fort Laramie	Corn	37%	Sugar Beets	25%	Dry Beans	26%	Alfalfa	12%
1990	Gering-Fort Laramie	Corn	34%	Sugar Beets	28%	Dry Beans	24%	Alfalfa	14%
1991	Gering-Fort Laramie	Corn	36%	Sugar Beets	26%	Dry Beans	23%	Alfalfa	15%
1992	Gering-Fort Laramie	Corn	41%	Sugar Beets	28%	Dry Beans	19%	Alfalfa	12%

Table 14: Mitchell District Crop Mix

Year	District	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Mitchell	Sugar Beets	27%	Dry Beans	26%	Alfalfa	25%	Grass Pasture	22%
1954	Mitchell	Sugar Beets	27%	Dry Beans	26%	Alfalfa	25%	Grass Pasture	22%
1955	Mitchell	Sugar Beets	27%	Dry Beans	26%	Alfalfa	25%	Grass Pasture	22%
1956	Mitchell	Sugar Beets	27%	Dry Beans	26%	Alfalfa	25%	Grass Pasture	22%
1957	Mitchell	Sugar Beets	27%	Dry Beans	26%	Alfalfa	25%	Grass Pasture	22%
1958	Mitchell	Corn	31%	Sugar Beets	26%	Dry Beans	22%	Grass Pasture	22%
1959	Mitchell	Corn	32%	Sugar Beets	27%	Dry Beans	19%	Grass Pasture	21%
1960	Mitchell	Corn	29%	Sugar Beets	28%	Dry Beans	22%	Grass Pasture	21%
1961	Mitchell	Corn	27%	Sugar Beets	29%	Dry Beans	23%	Grass Pasture	20%
1962	Mitchell	Corn	29%	Sugar Beets	29%	Dry Beans	22%	Alfalfa	20%
1963	Mitchell	Corn	29%	Sugar Beets	30%	Dry Beans	22%	Alfalfa	19%
1964	Mitchell	Corn	30%	Sugar Beets	29%	Dry Beans	21%	Grass Pasture	20%
1965	Mitchell	Corn	30%	Sugar Beets	27%	Dry Beans	22%	Grass Pasture	21%
1966	Mitchell	Corn	34%	Sugar Beets	26%	Dry Beans	21%	Alfalfa	19%
1967	Mitchell	Corn	39%	Sugar Beets	24%	Dry Beans	20%	Alfalfa	18%
1968	Mitchell	Corn	35%	Sugar Beets	24%	Dry Beans	23%	Grass Pasture	18%
1969	Mitchell	Corn	32%	Sugar Beets	23%	Dry Beans	27%	Grass Pasture	18%
1970	Mitchell	Corn	36%	Sugar Beets	23%	Dry Beans	24%	Alfalfa	18%
1971	Mitchell	Corn	36%	Sugar Beets	24%	Dry Beans	22%	Alfalfa	18%
1972	Mitchell	Corn	35%	Sugar Beets	25%	Dry Beans	24%	Alfalfa	17%
1973	Mitchell	Corn	34%	Sugar Beets	22%	Dry Beans	26%	Alfalfa	18%
1974	Mitchell	Corn	35%	Sugar Beets	24%	Dry Beans	25%	Alfalfa	16%
1975	Mitchell	Corn	31%	Sugar Beets	28%	Dry Beans	24%	Alfalfa	17%
1976	Mitchell	Corn	37%	Sugar Beets	23%	Dry Beans	22%	Alfalfa	18%
1977	Mitchell	Corn	40%	Sugar Beets	24%	Dry Beans	19%	Alfalfa	17%
1978	Mitchell	Corn	40%	Sugar Beets	23%	Dry Beans	22%	Alfalfa	15%
1979	Mitchell	Corn	40%	Sugar Beets	23%	Dry Beans	21%	Alfalfa	15%
1980	Mitchell	Corn	40%	Sugar Beets	23%	Dry Beans	21%	Alfalfa	16%
1981	Mitchell	Corn	38%	Sugar Beets	21%	Dry Beans	25%	Alfalfa	17%
1982	Mitchell	Corn	43%	Sugar Beets	17%	Dry Beans	25%	Alfalfa	16%
1983	Mitchell	Corn	55%	Sugar Beets	17%	Alfalfa	16%	Grass Pasture	13%
1984	Mitchell	Corn	51%	Sugar Beets	17%	Dry Beans	18%	Alfalfa	14%
1985	Mitchell	Corn	56%	Sugar Beets	15%	Dry Beans	13%	Alfalfa	15%
1986	Mitchell	Corn	49%	Sugar Beets	16%	Dry Beans	20%	Alfalfa	16%
1987	Mitchell	Corn	44%	Sugar Beets	16%	Dry Beans	23%	Alfalfa	17%
1988	Mitchell	Corn	44%	Sugar Beets	22%	Dry Beans	18%	Alfalfa	16%
1989	Mitchell	Corn	46%	Sugar Beets	21%	Dry Beans	19%	Alfalfa	15%
1990	Mitchell	Corn	36%	Sugar Beets	26%	Dry Beans	21%	Alfalfa	16%
1991	Mitchell	Corn	43%	Sugar Beets	24%	Dry Beans	19%	Alfalfa	15%
1992	Mitchell	Corn	41%	Sugar Beets	24%	Dry Beans	18%	Alfalfa	17%

Table 15: Northport District Crop Mix

Year	District	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Northport	Dry Beans	27%	Alfalfa	24%	Grass Pasture	25%	Small Grains	24%
1954	Northport	Corn	22%	Dry Beans	26%	Alfalfa	21%	Grass Pasture	31%
1955	Northport	Corn	32%	Dry Beans	23%	Alfalfa	20%	Grass Pasture	25%
1956	Northport	Corn	27%	Dry Beans	24%	Alfalfa	23%	Grass Pasture	26%
1957	Northport	Corn	35%	Dry Beans	21%	Alfalfa	23%	Grass Pasture	20%
1958	Northport	Corn	27%	Dry Beans	25%	Alfalfa	23%	Grass Pasture	25%
1959	Northport	Corn	29%	Dry Beans	24%	Alfalfa	21%	Grass Pasture	26%
1960	Northport	Corn	32%	Dry Beans	20%	Alfalfa	24%	Grass Pasture	24%
1961	Northport	Corn	24%	Dry Beans	21%	Alfalfa	26%	Grass Pasture	29%
1962	Northport	Corn	28%	Dry Beans	23%	Alfalfa	24%	Grass Pasture	25%
1963	Northport	Corn	27%	Dry Beans	21%	Alfalfa	24%	Grass Pasture	28%
1964	Northport	Corn	29%	Dry Beans	21%	Alfalfa	24%	Grass Pasture	26%
1965	Northport	Corn	30%	Dry Beans	21%	Alfalfa	25%	Grass Pasture	25%
1966	Northport	Corn	30%	Dry Beans	24%	Alfalfa	23%	Grass Pasture	23%
1967	Northport	Corn	34%	Dry Beans	20%	Alfalfa	23%	Grass Pasture	23%
1968	Northport	Corn	33%	Dry Beans	23%	Alfalfa	20%	Grass Pasture	24%
1969	Northport	Corn	30%	Dry Beans	26%	Alfalfa	20%	Grass Pasture	24%
1970	Northport	Corn	34%	Dry Beans	25%	Alfalfa	20%	Grass Pasture	21%
1971	Northport	Corn	34%	Sugar Beets	19%	Dry Beans	25%	Grass Pasture	21%
1972	Northport	Corn	33%	Dry Beans	28%	Alfalfa	21%	Grass Pasture	19%
1973	Northport	Corn	33%	Dry Beans	28%	Alfalfa	19%	Grass Pasture	19%
1974	Northport	Corn	33%	Dry Beans	28%	Alfalfa	21%	Grass Pasture	18%
1975	Northport	Corn	33%	Dry Beans	29%	Alfalfa	20%	Grass Pasture	18%
1976	Northport	Corn	37%	Dry Beans	27%	Alfalfa	20%	Grass Pasture	17%
1977	Northport	Corn	39%	Dry Beans	25%	Alfalfa	21%	Grass Pasture	15%
1978	Northport	Corn	39%	Dry Beans	27%	Alfalfa	20%	Grass Pasture	15%
1979	Northport	Corn	39%	Dry Beans	30%	Alfalfa	17%	Grass Pasture	14%
1980	Northport	Corn	35%	Dry Beans	28%	Alfalfa	16%	Grass Pasture	20%
1981	Northport	Corn	39%	Sugar Beets	18%	Dry Beans	31%	Grass Pasture	12%
1982	Northport	Corn	43%	Dry Beans	31%	Alfalfa	14%	Grass Pasture	13%
1983	Northport	Corn	46%	Dry Beans	21%	Alfalfa	16%	Grass Pasture	16%
1984	Northport	Corn	51%	Dry Beans	22%	Alfalfa	15%	Grass Pasture	12%
1985	Northport	Corn	50%	Dry Beans	22%	Alfalfa	14%	Grass Pasture	13%
1986	Northport	Corn	43%	Dry Beans	29%	Alfalfa	16%	Grass Pasture	13%
1987	Northport	Corn	40%	Dry Beans	29%	Alfalfa	12%	Grass Pasture	19%
1988	Northport	Corn	41%	Sugar Beets	13%	Dry Beans	31%	Grass Pasture	15%
1989	Northport	Corn	43%	Dry Beans	35%	Alfalfa	11%	Grass Pasture	11%
1990	Northport	Corn	38%	Dry Beans	37%	Alfalfa	14%	Grass Pasture	11%
1991	Northport	Corn	40%	Dry Beans	33%	Alfalfa	17%	Grass Pasture	10%
1992	Northport	Corn	44%	Sugar Beets	13%	Dry Beans	27%	Alfalfa	16%

Table 16: Pathfinder District Crop Mix

Year	District	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Pathfinder	Corn	21%	Dry Beans	31%	Alfalfa	26%	Small Grains	22%
1954	Pathfinder	Corn	23%	Dry Beans	32%	Alfalfa	27%	Small Grains	18%
1955	Pathfinder	Corn	32%	Dry Beans	31%	Alfalfa	22%	Grass Pasture	15%
1956	Pathfinder	Corn	35%	Sugar Beets	15%	Dry Beans	26%	Alfalfa	24%
1957	Pathfinder	Corn	37%	Dry Beans	24%	Alfalfa	23%	Grass Pasture	16%
1958	Pathfinder	Corn	34%	Dry Beans	28%	Alfalfa	22%	Small Grains	16%
1959	Pathfinder	Corn	34%	Sugar Beets	14%	Dry Beans	28%	Alfalfa	24%
1960	Pathfinder	Corn	37%	Sugar Beets	17%	Dry Beans	27%	Alfalfa	19%
1961	Pathfinder	Corn	26%	Dry Beans	30%	Alfalfa	23%	Grass Pasture	22%
1962	Pathfinder	Corn	30%	Sugar Beets	19%	Dry Beans	29%	Alfalfa	22%
1963	Pathfinder	Corn	31%	Sugar Beets	19%	Dry Beans	27%	Alfalfa	23%
1964	Pathfinder	Corn	34%	Sugar Beets	18%	Dry Beans	26%	Alfalfa	22%
1965	Pathfinder	Corn	31%	Sugar Beets	16%	Dry Beans	27%	Alfalfa	26%
1966	Pathfinder	Corn	35%	Dry Beans	26%	Alfalfa	22%	Grass Pasture	17%
1967	Pathfinder	Corn	36%	Dry Beans	23%	Alfalfa	24%	Grass Pasture	17%
1968	Pathfinder	Corn	34%	Sugar Beets	17%	Dry Beans	27%	Alfalfa	21%
1969	Pathfinder	Corn	29%	Sugar Beets	15%	Dry Beans	34%	Alfalfa	22%
1970	Pathfinder	Corn	36%	Dry Beans	28%	Alfalfa	17%	Grass Pasture	19%
1971	Pathfinder	Corn	35%	Sugar Beets	17%	Dry Beans	27%	Alfalfa	21%
1972	Pathfinder	Corn	33%	Sugar Beets	16%	Dry Beans	30%	Alfalfa	20%
1973	Pathfinder	Corn	40%	Sugar Beets	15%	Dry Beans	28%	Alfalfa	17%
1974	Pathfinder	Corn	40%	Sugar Beets	17%	Dry Beans	29%	Alfalfa	15%
1975	Pathfinder	Corn	40%	Sugar Beets	17%	Dry Beans	27%	Alfalfa	16%
1976	Pathfinder	Corn	38%	Sugar Beets	17%	Dry Beans	29%	Alfalfa	17%
1977	Pathfinder	Corn	40%	Sugar Beets	15%	Dry Beans	28%	Alfalfa	18%
1978	Pathfinder	Corn	44%	Sugar Beets	14%	Dry Beans	27%	Grass Pasture	15%
1979	Pathfinder	Corn	45%	Sugar Beets	17%	Dry Beans	25%	Alfalfa	13%
1980	Pathfinder	Corn	46%	Sugar Beets	13%	Dry Beans	27%	Grass Pasture	14%
1981	Pathfinder	Corn	40%	Sugar Beets	17%	Dry Beans	31%	Grass Pasture	12%
1982	Pathfinder	Corn	45%	Dry Beans	31%	Alfalfa	9%	Grass Pasture	15%
1983	Pathfinder	Corn	53%	Sugar Beets	12%	Dry Beans	19%	Grass Pasture	16%
1984	Pathfinder	Corn	47%	Sugar Beets	15%	Dry Beans	23%	Grass Pasture	16%
1985	Pathfinder	Corn	62%	Sugar Beets	10%	Dry Beans	15%	Alfalfa	12%
1986	Pathfinder	Corn	48%	Sugar Beets	12%	Dry Beans	25%	Alfalfa	14%
1987	Pathfinder	Corn	48%	Sugar Beets	12%	Dry Beans	29%	Alfalfa	11%
1988	Pathfinder	Corn	53%	Sugar Beets	12%	Dry Beans	23%	Alfalfa	12%
1989	Pathfinder	Corn	47%	Dry Beans	22%	Alfalfa	17%	Grass Pasture	14%
1990	Pathfinder	Corn	43%	Dry Beans	25%	Alfalfa	16%	Grass Pasture	16%
1991	Pathfinder	Corn	48%	Sugar Beets	15%	Dry Beans	26%	Alfalfa	12%
1992	Pathfinder	Corn	54%	Sugar Beets	10%	Dry Beans	18%	Grass Pasture	18%

Table 17: Banner County Irrigated Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Banner	Corn	20%	Potatoes	7%	Alfalfa	49%	Small Grains	25%
1954	Banner	Corn	22%	Alfalfa	49%	Small Grains	29%		
1955	Banner	Corn	25%	Dry Beans	0%	Alfalfa	51%	Small Grains	23%
1956	Banner	Corn	27%	Dry Beans	1%	Alfalfa	54%	Small Grains	18%
1957	Banner	Corn	29%	Dry Beans	1%	Alfalfa	56%	Small Grains	14%
1958	Banner	Corn	31%	Dry Beans	1%	Alfalfa	57%	Small Grains	10%
1959	Banner	Corn	33%	Dry Beans	1%	Alfalfa	59%	Small Grains	7%
1960	Banner	Corn	32%	Sorghum	1%	Alfalfa	60%	Small Grains	7%
1961	Banner	Corn	30%	Sorghum	2%	Alfalfa	61%	Small Grains	6%
1962	Banner	Corn	29%	Sorghum	3%	Alfalfa	62%	Small Grains	6%
1963	Banner	Corn	27%	Sorghum	4%	Alfalfa	63%	Small Grains	6%
1964	Banner	Corn	26%	Sorghum	5%	Alfalfa	63%	Small Grains	6%
1965	Banner	Corn	23%	Potatoes	7%	Alfalfa	62%	Small Grains	8%
1966	Banner	Corn	20%	Potatoes	10%	Alfalfa	61%	Small Grains	9%
1967	Banner	Corn	18%	Potatoes	12%	Alfalfa	60%	Small Grains	10%
1968	Banner	Corn	16%	Potatoes	14%	Alfalfa	59%	Small Grains	11%
1969	Banner	Corn	14%	Potatoes	16%	Alfalfa	58%	Small Grains	12%
1970	Banner	Corn	12%	Potatoes	23%	Alfalfa	54%	Small Grains	11%
1971	Banner	Corn	11%	Potatoes	28%	Alfalfa	50%	Small Grains	11%
1972	Banner	Corn	10%	Potatoes	32%	Alfalfa	47%	Small Grains	11%
1973	Banner	Corn	9%	Potatoes	36%	Alfalfa	45%	Small Grains	11%
1974	Banner	Corn	8%	Potatoes	38%	Alfalfa	43%	Small Grains	10%
1975	Banner	Corn	14%	Potatoes	31%	Alfalfa	39%	Small Grains	16%
1976	Banner	Corn	19%	Potatoes	25%	Alfalfa	36%	Small Grains	20%
1977	Banner	Corn	23%	Potatoes	19%	Alfalfa	33%	Small Grains	24%
1978	Banner	Corn	27%	Potatoes	14%	Alfalfa	31%	Small Grains	28%
1979	Banner	Corn	29%	Potatoes	16%	Alfalfa	29%	Small Grains	26%
1980	Banner	Corn	30%	Potatoes	18%	Alfalfa	28%	Small Grains	24%
1981	Banner	Corn	32%	Potatoes	19%	Alfalfa	27%	Small Grains	22%
1982	Banner	Corn	32%	Dry Beans	21%	Alfalfa	26%	Small Grains	21%
1983	Banner	Corn	32%	Dry Beans	21%	Potatoes	21%	Alfalfa	27%
1984	Banner	Corn	31%	Potatoes	21%	Alfalfa	27%	Small Grains	20%
1985	Banner	Corn	31%	Potatoes	22%	Alfalfa	28%	Small Grains	20%
1986	Banner	Corn	30%	Potatoes	23%	Alfalfa	28%	Small Grains	19%
1987	Banner	Corn	29%	Potatoes	23%	Alfalfa	29%	Small Grains	19%
1988	Banner	Corn	31%	Potatoes	21%	Alfalfa	29%	Small Grains	19%
1989	Banner	Corn	33%	Potatoes	18%	Alfalfa	30%	Small Grains	19%
1990	Banner	Corn	35%	Sugar Beets	17%	Alfalfa	30%	Small Grains	19%
1991	Banner	Corn	36%	Sugar Beets	17%	Alfalfa	30%	Small Grains	18%
1992	Banner	Corn	36%	Sugar Beets	17%	Alfalfa	30%	Small Grains	17%

Table 18: Garden County Irrigated Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Garden	Corn	37%	Sorghum	8%	Alfalfa	46%	Small Grains	9%
1954	Garden	Corn	36%	Sorghum	9%	Alfalfa	46%	Small Grains	9%
1955	Garden	Corn	41%	Sorghum	8%	Alfalfa	44%	Small Grains	8%
1956	Garden	Corn	45%	Sorghum	7%	Alfalfa	41%	Small Grains	7%
1957	Garden	Corn	49%	Sorghum	6%	Alfalfa	39%	Small Grains	6%
1958	Garden	Corn	54%	Sorghum	5%	Alfalfa	36%	Small Grains	5%
1959	Garden	Corn	58%	Sorghum	4%	Alfalfa	34%	Small Grains	5%
1960	Garden	Corn	55%	Sorghum	5%	Alfalfa	35%	Small Grains	4%
1961	Garden	Corn	53%	Sugar Beets	4%	Sorghum	7%	Alfalfa	36%
1962	Garden	Corn	51%	Sugar Beets	4%	Sorghum	8%	Alfalfa	37%
1963	Garden	Corn	49%	Sugar Beets	4%	Sorghum	9%	Alfalfa	38%
1964	Garden	Corn	46%	Sugar Beets	4%	Sorghum	11%	Alfalfa	39%
1965	Garden	Corn	44%	Sugar Beets	4%	Sorghum	9%	Alfalfa	42%
1966	Garden	Corn	43%	Sugar Beets	5%	Sorghum	8%	Alfalfa	45%
1967	Garden	Corn	41%	Sugar Beets	5%	Sorghum	6%	Alfalfa	47%
1968	Garden	Corn	40%	Sugar Beets	6%	Alfalfa	50%	Small Grains	5%
1969	Garden	Corn	38%	Sugar Beets	5%	Alfalfa	52%	Small Grains	5%
1970	Garden	Corn	41%	Sugar Beets	4%	Alfalfa	49%	Small Grains	6%
1971	Garden	Corn	44%	Sugar Beets	3%	Alfalfa	46%	Small Grains	6%
1972	Garden	Corn	46%	Dry Beans	3%	Alfalfa	44%	Small Grains	7%
1973	Garden	Corn	48%	Dry Beans	3%	Alfalfa	43%	Small Grains	7%
1974	Garden	Corn	49%	Dry Beans	3%	Alfalfa	41%	Small Grains	7%
1975	Garden	Corn	51%	Dry Beans	3%	Alfalfa	41%	Small Grains	6%
1976	Garden	Corn	52%	Dry Beans	2%	Alfalfa	41%	Small Grains	5%
1977	Garden	Corn	53%	Dry Beans	2%	Alfalfa	41%	Small Grains	4%
1978	Garden	Corn	53%	Dry Beans	2%	Alfalfa	41%	Small Grains	4%
1979	Garden	Corn	47%	Sorghum	14%	Alfalfa	32%	Small Grains	6%
1980	Garden	Corn	43%	Sorghum	23%	Alfalfa	25%	Small Grains	8%
1981	Garden	Corn	40%	Sorghum	30%	Alfalfa	21%	Small Grains	9%
1982	Garden	Corn	38%	Sorghum	35%	Alfalfa	17%	Small Grains	10%
1983	Garden	Corn	39%	Sorghum	31%	Alfalfa	20%	Small Grains	11%
1984	Garden	Corn	40%	Sorghum	26%	Alfalfa	23%	Small Grains	11%
1985	Garden	Corn	41%	Sorghum	20%	Alfalfa	27%	Small Grains	12%
1986	Garden	Corn	43%	Sorghum	12%	Alfalfa	32%	Small Grains	13%
1987	Garden	Corn	43%	Dry Beans	9%	Alfalfa	36%	Small Grains	12%
1988	Garden	Corn	45%	Dry Beans	8%	Alfalfa	35%	Small Grains	12%
1989	Garden	Corn	47%	Dry Beans	8%	Alfalfa	34%	Small Grains	11%
1990	Garden	Corn	49%	Dry Beans	7%	Alfalfa	34%	Small Grains	11%
1991	Garden	Corn	51%	Dry Beans	6%	Alfalfa	33%	Small Grains	10%
1992	Garden	Corn	54%	Dry Beans	5%	Alfalfa	32%	Small Grains	10%

Table 19: Morrill County Irrigated Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Morrill	Corn	22%	Sugar Beets	17%	Dry Beans	31%	Alfalfa	30%
1954	Morrill	Corn	20%	Sugar Beets	19%	Dry Beans	30%	Alfalfa	31%
1955	Morrill	Corn	22%	Sugar Beets	18%	Dry Beans	29%	Alfalfa	31%
1956	Morrill	Corn	24%	Sugar Beets	18%	Dry Beans	27%	Alfalfa	31%
1957	Morrill	Corn	26%	Sugar Beets	18%	Dry Beans	26%	Alfalfa	30%
1958	Morrill	Corn	27%	Sugar Beets	18%	Dry Beans	25%	Alfalfa	30%
1959	Morrill	Corn	29%	Sugar Beets	18%	Dry Beans	23%	Alfalfa	30%
1960	Morrill	Corn	29%	Sugar Beets	18%	Dry Beans	23%	Alfalfa	30%
1961	Morrill	Corn	30%	Sugar Beets	18%	Dry Beans	22%	Alfalfa	30%
1962	Morrill	Corn	30%	Sugar Beets	18%	Dry Beans	22%	Alfalfa	30%
1963	Morrill	Corn	31%	Sugar Beets	19%	Dry Beans	21%	Alfalfa	30%
1964	Morrill	Corn	31%	Sugar Beets	19%	Dry Beans	20%	Alfalfa	30%
1965	Morrill	Corn	30%	Sugar Beets	19%	Dry Beans	21%	Alfalfa	30%
1966	Morrill	Corn	29%	Sugar Beets	18%	Dry Beans	21%	Alfalfa	31%
1967	Morrill	Corn	29%	Sugar Beets	18%	Dry Beans	21%	Alfalfa	32%
1968	Morrill	Corn	28%	Sugar Beets	18%	Dry Beans	21%	Alfalfa	33%
1969	Morrill	Corn	27%	Sugar Beets	17%	Dry Beans	22%	Alfalfa	34%
1970	Morrill	Corn	29%	Sugar Beets	16%	Dry Beans	22%	Alfalfa	33%
1971	Morrill	Corn	31%	Sugar Beets	15%	Dry Beans	22%	Alfalfa	32%
1972	Morrill	Corn	32%	Sugar Beets	15%	Dry Beans	22%	Alfalfa	31%
1973	Morrill	Corn	34%	Sugar Beets	14%	Dry Beans	22%	Alfalfa	30%
1974	Morrill	Corn	35%	Sugar Beets	13%	Dry Beans	22%	Alfalfa	29%
1975	Morrill	Corn	37%	Sugar Beets	12%	Dry Beans	22%	Alfalfa	29%
1976	Morrill	Corn	39%	Sugar Beets	12%	Dry Beans	21%	Alfalfa	28%
1977	Morrill	Corn	40%	Sugar Beets	12%	Dry Beans	21%	Alfalfa	27%
1978	Morrill	Corn	41%	Sugar Beets	11%	Dry Beans	21%	Alfalfa	27%
1979	Morrill	Corn	43%	Sugar Beets	10%	Dry Beans	23%	Alfalfa	25%
1980	Morrill	Corn	44%	Sugar Beets	9%	Dry Beans	25%	Alfalfa	23%
1981	Morrill	Corn	45%	Sugar Beets	8%	Dry Beans	27%	Alfalfa	21%
1982	Morrill	Corn	46%	Sugar Beets	7%	Dry Beans	28%	Alfalfa	19%
1983	Morrill	Corn	46%	Sugar Beets	7%	Dry Beans	28%	Alfalfa	19%
1984	Morrill	Corn	45%	Sugar Beets	8%	Dry Beans	28%	Alfalfa	19%
1985	Morrill	Corn	45%	Sugar Beets	8%	Dry Beans	28%	Alfalfa	19%
1986	Morrill	Corn	45%	Sugar Beets	9%	Dry Beans	27%	Alfalfa	19%
1987	Morrill	Corn	45%	Sugar Beets	10%	Dry Beans	27%	Alfalfa	18%
1988	Morrill	Corn	46%	Sugar Beets	10%	Dry Beans	26%	Alfalfa	18%
1989	Morrill	Corn	47%	Sugar Beets	10%	Dry Beans	24%	Alfalfa	18%
1990	Morrill	Corn	48%	Sugar Beets	11%	Dry Beans	23%	Alfalfa	18%
1991	Morrill	Corn	49%	Sugar Beets	11%	Dry Beans	22%	Alfalfa	18%
1992	Morrill	Corn	50%	Sugar Beets	11%	Dry Beans	20%	Alfalfa	18%

Table 20: Scotts Bluff County Irrigated Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Scotts Bluff	Corn	20%	Sugar Beets	22%	Dry Beans	33%	Alfalfa	26%
1954	Scotts Bluff	Corn	21%	Sugar Beets	22%	Dry Beans	30%	Alfalfa	26%
1955	Scotts Bluff	Corn	24%	Sugar Beets	22%	Dry Beans	30%	Alfalfa	24%
1956	Scotts Bluff	Corn	26%	Sugar Beets	22%	Dry Beans	29%	Alfalfa	23%
1957	Scotts Bluff	Corn	28%	Sugar Beets	22%	Dry Beans	28%	Alfalfa	21%
1958	Scotts Bluff	Corn	31%	Sugar Beets	22%	Dry Beans	27%	Alfalfa	20%
1959	Scotts Bluff	Corn	33%	Sugar Beets	22%	Dry Beans	26%	Alfalfa	19%
1960	Scotts Bluff	Corn	32%	Sugar Beets	23%	Dry Beans	26%	Alfalfa	19%
1961	Scotts Bluff	Corn	31%	Sugar Beets	24%	Dry Beans	26%	Alfalfa	19%
1962	Scotts Bluff	Corn	31%	Sugar Beets	25%	Dry Beans	25%	Alfalfa	19%
1963	Scotts Bluff	Corn	30%	Sugar Beets	26%	Dry Beans	25%	Alfalfa	19%
1964	Scotts Bluff	Corn	30%	Sugar Beets	27%	Dry Beans	24%	Alfalfa	19%
1965	Scotts Bluff	Corn	29%	Sugar Beets	27%	Dry Beans	26%	Alfalfa	19%
1966	Scotts Bluff	Corn	28%	Sugar Beets	26%	Dry Beans	27%	Alfalfa	18%
1967	Scotts Bluff	Corn	28%	Sugar Beets	26%	Dry Beans	28%	Alfalfa	18%
1968	Scotts Bluff	Corn	27%	Sugar Beets	25%	Dry Beans	30%	Alfalfa	18%
1969	Scotts Bluff	Corn	26%	Sugar Beets	25%	Dry Beans	31%	Alfalfa	18%
1970	Scotts Bluff	Corn	28%	Sugar Beets	24%	Dry Beans	31%	Alfalfa	17%
1971	Scotts Bluff	Corn	29%	Sugar Beets	24%	Dry Beans	30%	Alfalfa	17%
1972	Scotts Bluff	Corn	30%	Sugar Beets	24%	Dry Beans	30%	Alfalfa	17%
1973	Scotts Bluff	Corn	31%	Sugar Beets	23%	Dry Beans	30%	Alfalfa	16%
1974	Scotts Bluff	Corn	32%	Sugar Beets	23%	Dry Beans	29%	Alfalfa	16%
1975	Scotts Bluff	Corn	34%	Sugar Beets	22%	Dry Beans	28%	Alfalfa	16%
1976	Scotts Bluff	Corn	35%	Sugar Beets	22%	Dry Beans	27%	Alfalfa	16%
1977	Scotts Bluff	Corn	36%	Sugar Beets	21%	Dry Beans	26%	Alfalfa	16%
1978	Scotts Bluff	Corn	37%	Sugar Beets	21%	Dry Beans	25%	Alfalfa	17%
1979	Scotts Bluff	Corn	39%	Sugar Beets	19%	Dry Beans	27%	Alfalfa	16%
1980	Scotts Bluff	Corn	40%	Sugar Beets	16%	Dry Beans	29%	Alfalfa	15%
1981	Scotts Bluff	Corn	41%	Sugar Beets	15%	Dry Beans	30%	Alfalfa	14%
1982	Scotts Bluff	Corn	42%	Sugar Beets	13%	Dry Beans	32%	Alfalfa	14%
1983	Scotts Bluff	Corn	42%	Sugar Beets	14%	Dry Beans	30%	Alfalfa	14%
1984	Scotts Bluff	Corn	42%	Sugar Beets	15%	Dry Beans	29%	Alfalfa	14%
1985	Scotts Bluff	Corn	41%	Sugar Beets	17%	Dry Beans	28%	Alfalfa	14%
1986	Scotts Bluff	Corn	41%	Sugar Beets	18%	Dry Beans	26%	Alfalfa	14%
1987	Scotts Bluff	Corn	41%	Sugar Beets	20%	Dry Beans	25%	Alfalfa	15%
1988	Scotts Bluff	Corn	42%	Sugar Beets	20%	Dry Beans	24%	Alfalfa	14%
1989	Scotts Bluff	Corn	43%	Sugar Beets	21%	Dry Beans	23%	Alfalfa	13%
1990	Scotts Bluff	Corn	43%	Sugar Beets	21%	Dry Beans	23%	Alfalfa	13%
1991	Scotts Bluff	Corn	44%	Sugar Beets	21%	Dry Beans	22%	Alfalfa	12%
1992	Scotts Bluff	Corn	45%	Sugar Beets	22%	Dry Beans	22%	Alfalfa	12%

Table 21: Sioux County Irrigated Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Sioux	Corn	22%	Sugar Beets	12%	Dry Beans	26%	Alfalfa	40%
1954	Sioux	Corn	19%	Sugar Beets	13%	Dry Beans	23%	Alfalfa	44%
1955	Sioux	Corn	22%	Sugar Beets	13%	Dry Beans	23%	Alfalfa	42%
1956	Sioux	Corn	25%	Sugar Beets	13%	Dry Beans	23%	Alfalfa	39%
1957	Sioux	Corn	28%	Sugar Beets	13%	Dry Beans	22%	Alfalfa	36%
1958	Sioux	Corn	31%	Sugar Beets	13%	Dry Beans	22%	Alfalfa	34%
1959	Sioux	Corn	34%	Sugar Beets	13%	Dry Beans	22%	Alfalfa	31%
1960	Sioux	Corn	32%	Sugar Beets	14%	Dry Beans	20%	Alfalfa	34%
1961	Sioux	Corn	30%	Sugar Beets	14%	Dry Beans	19%	Alfalfa	37%
1962	Sioux	Corn	28%	Sugar Beets	15%	Dry Beans	18%	Alfalfa	39%
1963	Sioux	Corn	26%	Sugar Beets	16%	Dry Beans	17%	Alfalfa	42%
1964	Sioux	Corn	24%	Sugar Beets	16%	Dry Beans	15%	Alfalfa	44%
1965	Sioux	Corn	23%	Sugar Beets	15%	Dry Beans	16%	Alfalfa	45%
1966	Sioux	Corn	22%	Sugar Beets	14%	Dry Beans	17%	Alfalfa	47%
1967	Sioux	Corn	21%	Sugar Beets	14%	Dry Beans	18%	Alfalfa	48%
1968	Sioux	Corn	20%	Sugar Beets	13%	Dry Beans	18%	Alfalfa	49%
1969	Sioux	Corn	19%	Sugar Beets	12%	Dry Beans	19%	Alfalfa	50%
1970	Sioux	Corn	21%	Sugar Beets	12%	Dry Beans	18%	Alfalfa	49%
1971	Sioux	Corn	23%	Sugar Beets	12%	Dry Beans	18%	Alfalfa	48%
1972	Sioux	Corn	24%	Sugar Beets	12%	Dry Beans	17%	Alfalfa	47%
1973	Sioux	Corn	26%	Sugar Beets	12%	Dry Beans	16%	Alfalfa	46%
1974	Sioux	Corn	28%	Sugar Beets	12%	Dry Beans	15%	Alfalfa	45%
1975	Sioux	Corn	28%	Sugar Beets	13%	Dry Beans	16%	Alfalfa	43%
1976	Sioux	Corn	28%	Sugar Beets	14%	Dry Beans	16%	Alfalfa	42%
1977	Sioux	Corn	29%	Sugar Beets	14%	Dry Beans	16%	Alfalfa	41%
1978	Sioux	Corn	29%	Sugar Beets	15%	Dry Beans	16%	Alfalfa	40%
1979	Sioux	Corn	30%	Sugar Beets	12%	Dry Beans	18%	Alfalfa	40%
1980	Sioux	Corn	31%	Sugar Beets	10%	Dry Beans	19%	Alfalfa	40%
1981	Sioux	Corn	32%	Sugar Beets	8%	Dry Beans	20%	Alfalfa	40%
1982	Sioux	Corn	33%	Sugar Beets	6%	Dry Beans	21%	Alfalfa	40%
1983	Sioux	Corn	33%	Sugar Beets	7%	Dry Beans	20%	Alfalfa	41%
1984	Sioux	Corn	33%	Sugar Beets	8%	Dry Beans	18%	Alfalfa	41%
1985	Sioux	Corn	33%	Sugar Beets	9%	Dry Beans	17%	Alfalfa	42%
1986	Sioux	Corn	33%	Sugar Beets	10%	Dry Beans	16%	Alfalfa	42%
1987	Sioux	Corn	33%	Sugar Beets	11%	Dry Beans	14%	Alfalfa	43%
1988	Sioux	Corn	36%	Sugar Beets	10%	Dry Beans	13%	Alfalfa	41%
1989	Sioux	Corn	39%	Sugar Beets	10%	Dry Beans	12%	Alfalfa	39%
1990	Sioux	Corn	41%	Sugar Beets	10%	Dry Beans	11%	Alfalfa	38%
1991	Sioux	Corn	44%	Sugar Beets	10%	Dry Beans	10%	Alfalfa	37%
1992	Sioux	Corn	46%	Sugar Beets	10%	Dry Beans	9%	Alfalfa	35%

Table 22: Banner County Dryland Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Banner	Corn	2%	Sorghum	3%	Small Grains	47%	Summer Fallow	48%
1954	Banner	Corn	2%	Sorghum	3%	Small Grains	46%	Summer Fallow	49%
1955	Banner	Corn	2%	Sorghum	3%	Small Grains	47%	Summer Fallow	49%
1956	Banner	Corn	2%	Sorghum	3%	Small Grains	47%	Summer Fallow	48%
1957	Banner	Corn	3%	Sorghum	2%	Small Grains	47%	Summer Fallow	48%
1958	Banner	Corn	3%	Sorghum	2%	Small Grains	47%	Summer Fallow	48%
1959	Banner	Corn	3%	Sorghum	2%	Small Grains	47%	Summer Fallow	48%
1960	Banner	Corn	3%	Sorghum	2%	Small Grains	47%	Summer Fallow	48%
1961	Banner	Corn	3%	Alfalfa	2%	Small Grains	46%	Summer Fallow	49%
1962	Banner	Corn	3%	Alfalfa	3%	Small Grains	45%	Summer Fallow	49%
1963	Banner	Corn	3%	Alfalfa	3%	Small Grains	45%	Summer Fallow	50%
1964	Banner	Corn	3%	Alfalfa	3%	Small Grains	44%	Summer Fallow	51%
1965	Banner	Sorghum	2%	Alfalfa	3%	Small Grains	44%	Summer Fallow	51%
1966	Banner	Sorghum	2%	Alfalfa	3%	Small Grains	43%	Summer Fallow	52%
1967	Banner	Sorghum	2%	Alfalfa	3%	Small Grains	43%	Summer Fallow	53%
1968	Banner	Sorghum	1%	Alfalfa	2%	Small Grains	43%	Summer Fallow	53%
1969	Banner	Sorghum	1%	Alfalfa	2%	Small Grains	43%	Summer Fallow	54%
1970	Banner	Sorghum	1%	Alfalfa	2%	Small Grains	44%	Summer Fallow	53%
1971	Banner	Sorghum	1%	Alfalfa	2%	Small Grains	46%	Summer Fallow	51%
1972	Banner	Sorghum	1%	Alfalfa	2%	Small Grains	47%	Summer Fallow	50%
1973	Banner	Sorghum	1%	Alfalfa	2%	Small Grains	48%	Summer Fallow	49%
1974	Banner	Sorghum	1%	Alfalfa	2%	Small Grains	49%	Summer Fallow	48%
1975	Banner	Sorghum	1%	Alfalfa	2%	Small Grains	49%	Summer Fallow	49%
1976	Banner	Sorghum	1%	Alfalfa	2%	Small Grains	48%	Summer Fallow	49%
1977	Banner	Sorghum	0%	Alfalfa	2%	Small Grains	47%	Summer Fallow	50%
1978	Banner	Sorghum	0%	Alfalfa	2%	Small Grains	47%	Summer Fallow	51%
1979	Banner	Sorghum	0%	Alfalfa	2%	Small Grains	48%	Summer Fallow	50%
1980	Banner	Sorghum	0%	Alfalfa	2%	Small Grains	49%	Summer Fallow	49%
1981	Banner	Sorghum	0%	Alfalfa	2%	Small Grains	50%	Summer Fallow	48%
1982	Banner	Sorghum	0%	Alfalfa	2%	Small Grains	51%	Summer Fallow	47%
1983	Banner	Alfalfa	2%	Small Grains	50%	Sunflower	1%	Summer Fallow	48%
1984	Banner	Alfalfa	2%	Small Grains	48%	Sunflower	2%	Summer Fallow	49%
1985	Banner	Alfalfa	2%	Small Grains	46%	Sunflower	3%	Summer Fallow	50%
1986	Banner	Alfalfa	2%	Small Grains	44%	Sunflower	4%	Summer Fallow	51%
1987	Banner	Alfalfa	2%	Small Grains	41%	Sunflower	5%	Summer Fallow	52%
1988	Banner	Alfalfa	2%	Small Grains	42%	Sunflower	5%	Summer Fallow	52%
1989	Banner	Alfalfa	1%	Small Grains	43%	Sunflower	4%	Summer Fallow	52%
1990	Banner	Alfalfa	1%	Small Grains	43%	Sunflower	4%	Summer Fallow	52%
1991	Banner	Alfalfa	1%	Small Grains	44%	Sunflower	3%	Summer Fallow	52%
1992	Banner	Alfalfa	1%	Small Grains	45%	Sunflower	3%	Summer Fallow	52%

Table 23: Garden County Dryland Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Garden	Corn	6%	Sorghum	7%	Small Grains	45%	Summer Fallow	42%
1954	Garden	Corn	6%	Sorghum	9%	Small Grains	43%	Summer Fallow	43%
1955	Garden	Corn	5%	Sorghum	9%	Small Grains	42%	Summer Fallow	44%
1956	Garden	Corn	5%	Sorghum	10%	Small Grains	40%	Summer Fallow	45%
1957	Garden	Corn	5%	Sorghum	10%	Small Grains	39%	Summer Fallow	46%
1958	Garden	Corn	4%	Sorghum	11%	Small Grains	37%	Summer Fallow	48%
1959	Garden	Corn	4%	Sorghum	11%	Small Grains	36%	Summer Fallow	49%
1960	Garden	Sorghum	10%	Alfalfa	4%	Small Grains	37%	Summer Fallow	49%
1961	Garden	Sorghum	9%	Alfalfa	4%	Small Grains	38%	Summer Fallow	49%
1962	Garden	Sorghum	8%	Alfalfa	4%	Small Grains	39%	Summer Fallow	50%
1963	Garden	Sorghum	6%	Alfalfa	4%	Small Grains	40%	Summer Fallow	50%
1964	Garden	Sorghum	5%	Alfalfa	4%	Small Grains	41%	Summer Fallow	50%
1965	Garden	Sorghum	5%	Alfalfa	4%	Small Grains	41%	Summer Fallow	50%
1966	Garden	Sorghum	4%	Alfalfa	4%	Small Grains	41%	Summer Fallow	51%
1967	Garden	Sorghum	3%	Alfalfa	4%	Small Grains	41%	Summer Fallow	51%
1968	Garden	Sorghum	3%	Alfalfa	4%	Small Grains	42%	Summer Fallow	52%
1969	Garden	Sorghum	2%	Alfalfa	4%	Small Grains	42%	Summer Fallow	52%
1970	Garden	Sorghum	2%	Alfalfa	4%	Small Grains	43%	Summer Fallow	51%
1971	Garden	Sorghum	2%	Alfalfa	4%	Small Grains	45%	Summer Fallow	49%
1972	Garden	Sorghum	2%	Alfalfa	5%	Small Grains	46%	Summer Fallow	47%
1973	Garden	Corn	2%	Alfalfa	5%	Small Grains	48%	Summer Fallow	46%
1974	Garden	Corn	2%	Alfalfa	5%	Small Grains	49%	Summer Fallow	44%
1975	Garden	Corn	1%	Alfalfa	4%	Small Grains	47%	Summer Fallow	47%
1976	Garden	Corn	1%	Alfalfa	3%	Small Grains	45%	Summer Fallow	51%
1977	Garden	Corn	1%	Alfalfa	2%	Small Grains	43%	Summer Fallow	54%
1978	Garden	Corn	0%	Alfalfa	2%	Small Grains	42%	Summer Fallow	56%
1979	Garden	Corn	0%	Alfalfa	2%	Small Grains	43%	Summer Fallow	55%
1980	Garden	Corn	0%	Alfalfa	2%	Small Grains	44%	Summer Fallow	53%
1981	Garden	Dry Beans	0%	Alfalfa	3%	Small Grains	45%	Summer Fallow	52%
1982	Garden	Dry Beans	0%	Alfalfa	3%	Small Grains	47%	Summer Fallow	50%
1983	Garden	Dry Beans	1%	Alfalfa	3%	Small Grains	47%	Summer Fallow	49%
1984	Garden	Dry Beans	1%	Alfalfa	4%	Small Grains	48%	Summer Fallow	48%
1985	Garden	Corn	1%	Alfalfa	4%	Small Grains	48%	Summer Fallow	47%
1986	Garden	Corn	1%	Alfalfa	4%	Small Grains	49%	Summer Fallow	45%
1987	Garden	Corn	2%	Alfalfa	5%	Small Grains	50%	Summer Fallow	44%
1988	Garden	Corn	1%	Alfalfa	5%	Small Grains	49%	Summer Fallow	45%
1989	Garden	Corn	1%	Alfalfa	4%	Small Grains	48%	Summer Fallow	47%
1990	Garden	Corn	1%	Alfalfa	4%	Small Grains	46%	Summer Fallow	48%
1991	Garden	Corn	1%	Alfalfa	4%	Small Grains	45%	Summer Fallow	49%
1992	Garden	Corn	1%	Alfalfa	4%	Small Grains	44%	Summer Fallow	51%

Table 24: Morrill County Dryland Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Morrill	Corn	12%	Sorghum	5%	Small Grains	46%	Summer Fallow	37%
1954	Morrill	Corn	14%	Sorghum	6%	Small Grains	42%	Summer Fallow	39%
1955	Morrill	Corn	12%	Sorghum	6%	Small Grains	42%	Summer Fallow	40%
1956	Morrill	Corn	11%	Sorghum	5%	Small Grains	43%	Summer Fallow	41%
1957	Morrill	Corn	9%	Sorghum	5%	Small Grains	43%	Summer Fallow	43%
1958	Morrill	Corn	8%	Sorghum	5%	Small Grains	43%	Summer Fallow	44%
1959	Morrill	Corn	6%	Alfalfa	5%	Small Grains	44%	Summer Fallow	45%
1960	Morrill	Corn	5%	Alfalfa	6%	Small Grains	43%	Summer Fallow	46%
1961	Morrill	Corn	5%	Alfalfa	8%	Small Grains	42%	Summer Fallow	46%
1962	Morrill	Corn	4%	Alfalfa	10%	Small Grains	40%	Summer Fallow	46%
1963	Morrill	Sorghum	4%	Alfalfa	11%	Small Grains	39%	Summer Fallow	46%
1964	Morrill	Sorghum	3%	Alfalfa	13%	Small Grains	38%	Summer Fallow	46%
1965	Morrill	Sorghum	3%	Alfalfa	12%	Small Grains	39%	Summer Fallow	46%
1966	Morrill	Corn	3%	Alfalfa	11%	Small Grains	40%	Summer Fallow	46%
1967	Morrill	Corn	3%	Alfalfa	9%	Small Grains	41%	Summer Fallow	46%
1968	Morrill	Corn	3%	Alfalfa	8%	Small Grains	43%	Summer Fallow	46%
1969	Morrill	Corn	4%	Alfalfa	7%	Small Grains	44%	Summer Fallow	46%
1970	Morrill	Corn	4%	Alfalfa	7%	Small Grains	43%	Summer Fallow	46%
1971	Morrill	Corn	4%	Alfalfa	7%	Small Grains	43%	Summer Fallow	46%
1972	Morrill	Corn	4%	Alfalfa	7%	Small Grains	42%	Summer Fallow	46%
1973	Morrill	Corn	4%	Alfalfa	7%	Small Grains	42%	Summer Fallow	46%
1974	Morrill	Corn	4%	Alfalfa	7%	Small Grains	42%	Summer Fallow	47%
1975	Morrill	Corn	4%	Alfalfa	7%	Small Grains	42%	Summer Fallow	47%
1976	Morrill	Corn	3%	Alfalfa	7%	Small Grains	42%	Summer Fallow	48%
1977	Morrill	Corn	2%	Alfalfa	7%	Small Grains	42%	Summer Fallow	49%
1978	Morrill	Corn	1%	Alfalfa	7%	Small Grains	43%	Summer Fallow	50%
1979	Morrill	Corn	1%	Alfalfa	6%	Small Grains	44%	Summer Fallow	49%
1980	Morrill	Corn	2%	Alfalfa	6%	Small Grains	45%	Summer Fallow	48%
1981	Morrill	Corn	2%	Alfalfa	5%	Small Grains	46%	Summer Fallow	47%
1982	Morrill	Corn	2%	Alfalfa	5%	Small Grains	47%	Summer Fallow	46%
1983	Morrill	Corn	2%	Alfalfa	4%	Small Grains	44%	Summer Fallow	50%
1984	Morrill	Corn	2%	Alfalfa	4%	Small Grains	41%	Summer Fallow	53%
1985	Morrill	Corn	1%	Alfalfa	4%	Small Grains	38%	Summer Fallow	57%
1986	Morrill	Corn	1%	Alfalfa	3%	Small Grains	35%	Summer Fallow	60%
1987	Morrill	Corn	1%	Alfalfa	3%	Small Grains	32%	Summer Fallow	64%
1988	Morrill	Corn	1%	Alfalfa	4%	Small Grains	34%	Summer Fallow	61%
1989	Morrill	Corn	1%	Alfalfa	4%	Small Grains	36%	Summer Fallow	59%
1990	Morrill	Corn	1%	Alfalfa	5%	Small Grains	38%	Summer Fallow	56%
1991	Morrill	Corn	1%	Alfalfa	6%	Small Grains	40%	Summer Fallow	52%
1992	Morrill	Dry Beans	2%	Alfalfa	7%	Small Grains	43%	Summer Fallow	48%

Table 25: Scotts Bluff County Dryland Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Scotts Bluff	Corn	5%	Alfalfa	5%	Small Grains	48%	Summer Fallow	42%
1954	Scotts Bluff	Corn	5%	Alfalfa	6%	Small Grains	43%	Summer Fallow	46%
1955	Scotts Bluff	Corn	5%	Alfalfa	5%	Small Grains	44%	Summer Fallow	46%
1956	Scotts Bluff	Corn	5%	Alfalfa	5%	Small Grains	44%	Summer Fallow	47%
1957	Scotts Bluff	Corn	4%	Alfalfa	4%	Small Grains	44%	Summer Fallow	47%
1958	Scotts Bluff	Corn	4%	Alfalfa	4%	Small Grains	44%	Summer Fallow	48%
1959	Scotts Bluff	Corn	4%	Alfalfa	3%	Small Grains	44%	Summer Fallow	49%
1960	Scotts Bluff	Corn	3%	Alfalfa	3%	Small Grains	44%	Summer Fallow	50%
1961	Scotts Bluff	Corn	3%	Alfalfa	3%	Small Grains	44%	Summer Fallow	50%
1962	Scotts Bluff	Corn	2%	Alfalfa	3%	Small Grains	43%	Summer Fallow	51%
1963	Scotts Bluff	Corn	2%	Alfalfa	3%	Small Grains	43%	Summer Fallow	52%
1964	Scotts Bluff	Dry Beans	2%	Alfalfa	3%	Small Grains	42%	Summer Fallow	53%
1965	Scotts Bluff	Dry Beans	2%	Alfalfa	3%	Small Grains	41%	Summer Fallow	54%
1966	Scotts Bluff	Corn	3%	Alfalfa	4%	Small Grains	39%	Summer Fallow	54%
1967	Scotts Bluff	Corn	4%	Alfalfa	4%	Small Grains	37%	Summer Fallow	55%
1968	Scotts Bluff	Corn	5%	Alfalfa	4%	Small Grains	35%	Summer Fallow	55%
1969	Scotts Bluff	Corn	7%	Alfalfa	4%	Small Grains	34%	Summer Fallow	55%
1970	Scotts Bluff	Corn	7%	Alfalfa	5%	Small Grains	36%	Summer Fallow	52%
1971	Scotts Bluff	Corn	7%	Alfalfa	6%	Small Grains	39%	Summer Fallow	48%
1972	Scotts Bluff	Corn	8%	Alfalfa	6%	Small Grains	41%	Summer Fallow	44%
1973	Scotts Bluff	Corn	8%	Alfalfa	7%	Small Grains	44%	Summer Fallow	41%
1974	Scotts Bluff	Corn	9%	Alfalfa	8%	Small Grains	46%	Summer Fallow	37%
1975	Scotts Bluff	Corn	8%	Alfalfa	7%	Small Grains	45%	Summer Fallow	40%
1976	Scotts Bluff	Corn	8%	Alfalfa	7%	Small Grains	43%	Summer Fallow	42%
1977	Scotts Bluff	Corn	7%	Alfalfa	6%	Small Grains	41%	Summer Fallow	45%
1978	Scotts Bluff	Corn	7%	Alfalfa	5%	Small Grains	39%	Summer Fallow	48%
1979	Scotts Bluff	Corn	6%	Alfalfa	5%	Small Grains	42%	Summer Fallow	47%
1980	Scotts Bluff	Corn	5%	Alfalfa	5%	Small Grains	44%	Summer Fallow	46%
1981	Scotts Bluff	Corn	4%	Alfalfa	5%	Small Grains	46%	Summer Fallow	45%
1982	Scotts Bluff	Corn	3%	Alfalfa	5%	Small Grains	48%	Summer Fallow	44%
1983	Scotts Bluff	Corn	3%	Alfalfa	5%	Small Grains	46%	Summer Fallow	45%
1984	Scotts Bluff	Corn	3%	Alfalfa	6%	Small Grains	44%	Summer Fallow	47%
1985	Scotts Bluff	Corn	3%	Alfalfa	6%	Small Grains	41%	Summer Fallow	49%
1986	Scotts Bluff	Corn	4%	Alfalfa	7%	Small Grains	38%	Summer Fallow	52%
1987	Scotts Bluff	Corn	4%	Alfalfa	7%	Small Grains	35%	Summer Fallow	54%
1988	Scotts Bluff	Corn	4%	Alfalfa	7%	Small Grains	34%	Summer Fallow	55%
1989	Scotts Bluff	Corn	4%	Alfalfa	6%	Small Grains	34%	Summer Fallow	56%
1990	Scotts Bluff	Alfalfa	6%	Small Grains	33%	Sunflower	4%	Summer Fallow	57%
1991	Scotts Bluff	Alfalfa	5%	Small Grains	32%	Sunflower	5%	Summer Fallow	58%
1992	Scotts Bluff	Alfalfa	5%	Small Grains	31%	Sunflower	5%	Summer Fallow	59%

Table 26: Sioux County Dryland Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Sioux	Corn	15%	Alfalfa	30%	Small Grains	39%	Summer Fallow	15%
1954	Sioux	Corn	18%	Alfalfa	33%	Small Grains	32%	Summer Fallow	17%
1955	Sioux	Corn	16%	Alfalfa	36%	Small Grains	31%	Summer Fallow	17%
1956	Sioux	Corn	14%	Alfalfa	38%	Small Grains	31%	Summer Fallow	18%
1957	Sioux	Corn	11%	Alfalfa	41%	Small Grains	30%	Summer Fallow	19%
1958	Sioux	Corn	9%	Alfalfa	43%	Small Grains	29%	Summer Fallow	19%
1959	Sioux	Corn	7%	Alfalfa	45%	Small Grains	28%	Summer Fallow	20%
1960	Sioux	Corn	6%	Alfalfa	46%	Small Grains	28%	Summer Fallow	20%
1961	Sioux	Corn	5%	Alfalfa	46%	Small Grains	29%	Summer Fallow	20%
1962	Sioux	Corn	4%	Alfalfa	46%	Small Grains	29%	Summer Fallow	20%
1963	Sioux	Corn	3%	Alfalfa	47%	Small Grains	30%	Summer Fallow	21%
1964	Sioux	Corn	2%	Alfalfa	47%	Small Grains	30%	Summer Fallow	21%
1965	Sioux	Corn	2%	Alfalfa	47%	Small Grains	28%	Summer Fallow	23%
1966	Sioux	Corn	2%	Alfalfa	47%	Small Grains	26%	Summer Fallow	24%
1967	Sioux	Corn	2%	Alfalfa	47%	Small Grains	24%	Summer Fallow	26%
1968	Sioux	Corn	2%	Alfalfa	47%	Small Grains	22%	Summer Fallow	28%
1969	Sioux	Corn	2%	Alfalfa	47%	Small Grains	21%	Summer Fallow	30%
1970	Sioux	Corn	3%	Alfalfa	47%	Small Grains	22%	Summer Fallow	28%
1971	Sioux	Corn	4%	Alfalfa	46%	Small Grains	23%	Summer Fallow	27%
1972	Sioux	Corn	4%	Alfalfa	46%	Small Grains	24%	Summer Fallow	25%
1973	Sioux	Corn	5%	Alfalfa	45%	Small Grains	26%	Summer Fallow	24%
1974	Sioux	Corn	6%	Alfalfa	44%	Small Grains	28%	Summer Fallow	22%
1975	Sioux	Corn	5%	Alfalfa	44%	Small Grains	27%	Summer Fallow	24%
1976	Sioux	Corn	3%	Alfalfa	45%	Small Grains	26%	Summer Fallow	26%
1977	Sioux	Corn	2%	Alfalfa	45%	Small Grains	26%	Summer Fallow	27%
1978	Sioux	Corn	1%	Alfalfa	45%	Small Grains	25%	Summer Fallow	29%
1979	Sioux	Corn	1%	Alfalfa	40%	Small Grains	23%	Summer Fallow	36%
1980	Sioux	Corn	1%	Alfalfa	36%	Small Grains	22%	Summer Fallow	41%
1981	Sioux	Corn	1%	Alfalfa	33%	Small Grains	21%	Summer Fallow	45%
1982	Sioux	Corn	1%	Alfalfa	30%	Small Grains	20%	Summer Fallow	49%
1983	Sioux	Corn	1%	Alfalfa	33%	Small Grains	21%	Summer Fallow	46%
1984	Sioux	Corn	0%	Alfalfa	36%	Small Grains	21%	Summer Fallow	43%
1985	Sioux	Corn	0%	Alfalfa	39%	Small Grains	21%	Summer Fallow	40%
1986	Sioux	Corn	0%	Alfalfa	42%	Small Grains	22%	Summer Fallow	36%
1987	Sioux	Dry Beans	0%	Alfalfa	47%	Small Grains	22%	Summer Fallow	31%
1988	Sioux	Corn	0%	Alfalfa	48%	Small Grains	21%	Summer Fallow	30%
1989	Sioux	Corn	0%	Alfalfa	50%	Small Grains	21%	Summer Fallow	29%
1990	Sioux	Corn	1%	Alfalfa	52%	Small Grains	20%	Summer Fallow	27%
1991	Sioux	Corn	1%	Alfalfa	55%	Small Grains	19%	Summer Fallow	26%
1992	Sioux	Corn	1%	Alfalfa	58%	Small Grains	17%	Summer Fallow	23%

Table 27: Cheyenne County Irrigated Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Cheyenne	Corn	21%	Dry Beans	17%	Alfalfa	48%	Small Grains	14%
1954	Cheyenne	Corn	20%	Dry Beans	15%	Alfalfa	50%	Small Grains	15%
1955	Cheyenne	Corn	27%	Dry Beans	15%	Alfalfa	45%	Small Grains	13%
1956	Cheyenne	Corn	32%	Dry Beans	15%	Alfalfa	41%	Small Grains	12%
1957	Cheyenne	Corn	38%	Dry Beans	15%	Alfalfa	37%	Small Grains	11%
1958	Cheyenne	Corn	43%	Dry Beans	15%	Alfalfa	33%	Small Grains	10%
1959	Cheyenne	Corn	47%	Dry Beans	15%	Alfalfa	30%	Small Grains	9%
1960	Cheyenne	Corn	47%	Dry Beans	14%	Alfalfa	30%	Small Grains	9%
1961	Cheyenne	Corn	47%	Dry Beans	14%	Alfalfa	30%	Small Grains	10%
1962	Cheyenne	Corn	46%	Dry Beans	14%	Alfalfa	30%	Small Grains	10%
1963	Cheyenne	Corn	46%	Sorghum	11%	Dry Beans	13%	Alfalfa	30%
1964	Cheyenne	Corn	45%	Sorghum	12%	Dry Beans	13%	Alfalfa	30%
1965	Cheyenne	Corn	45%	Dry Beans	12%	Alfalfa	32%	Small Grains	10%
1966	Cheyenne	Corn	44%	Dry Beans	12%	Alfalfa	34%	Small Grains	10%
1967	Cheyenne	Corn	44%	Dry Beans	11%	Alfalfa	36%	Small Grains	10%
1968	Cheyenne	Corn	43%	Dry Beans	10%	Alfalfa	37%	Small Grains	10%
1969	Cheyenne	Corn	43%	Dry Beans	10%	Alfalfa	38%	Small Grains	9%
1970	Cheyenne	Corn	43%	Dry Beans	9%	Alfalfa	37%	Small Grains	10%
1971	Cheyenne	Corn	43%	Dry Beans	9%	Alfalfa	37%	Small Grains	11%
1972	Cheyenne	Corn	44%	Dry Beans	9%	Alfalfa	36%	Small Grains	11%
1973	Cheyenne	Corn	44%	Dry Beans	9%	Alfalfa	35%	Small Grains	12%
1974	Cheyenne	Corn	44%	Dry Beans	8%	Alfalfa	35%	Small Grains	13%
1975	Cheyenne	Corn	45%	Dry Beans	9%	Alfalfa	32%	Small Grains	13%
1976	Cheyenne	Corn	46%	Dry Beans	10%	Alfalfa	30%	Small Grains	14%
1977	Cheyenne	Corn	47%	Dry Beans	10%	Alfalfa	29%	Small Grains	14%
1978	Cheyenne	Corn	47%	Dry Beans	11%	Alfalfa	28%	Small Grains	14%
1979	Cheyenne	Corn	44%	Dry Beans	15%	Alfalfa	24%	Small Grains	18%
1980	Cheyenne	Corn	40%	Dry Beans	18%	Alfalfa	21%	Small Grains	21%
1981	Cheyenne	Corn	37%	Dry Beans	21%	Alfalfa	17%	Small Grains	24%
1982	Cheyenne	Corn	35%	Dry Beans	24%	Alfalfa	15%	Small Grains	27%
1983	Cheyenne	Corn	35%	Dry Beans	25%	Alfalfa	15%	Small Grains	25%
1984	Cheyenne	Corn	35%	Dry Beans	25%	Alfalfa	16%	Small Grains	24%
1985	Cheyenne	Corn	36%	Dry Beans	25%	Alfalfa	16%	Small Grains	23%
1986	Cheyenne	Corn	36%	Dry Beans	26%	Alfalfa	17%	Small Grains	21%
1987	Cheyenne	Corn	36%	Dry Beans	26%	Alfalfa	17%	Small Grains	20%
1988	Cheyenne	Corn	38%	Dry Beans	25%	Alfalfa	16%	Small Grains	20%
1989	Cheyenne	Corn	40%	Dry Beans	24%	Alfalfa	15%	Small Grains	21%
1990	Cheyenne	Corn	41%	Dry Beans	23%	Alfalfa	15%	Small Grains	21%
1991	Cheyenne	Corn	42%	Dry Beans	22%	Alfalfa	14%	Small Grains	22%
1992	Cheyenne	Corn	44%	Dry Beans	21%	Alfalfa	13%	Small Grains	22%

Table 28: Deuel County Irrigated Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Deuel	Corn	32%	Sugar Beets	18%	Alfalfa	33%	Small Grains	17%
1954	Deuel	Corn	30%	Sugar Beets	20%	Alfalfa	32%	Small Grains	18%
1955	Deuel	Corn	39%	Sugar Beets	17%	Alfalfa	29%	Small Grains	14%
1956	Deuel	Corn	47%	Sugar Beets	15%	Alfalfa	27%	Small Grains	11%
1957	Deuel	Corn	53%	Sugar Beets	13%	Alfalfa	25%	Small Grains	9%
1958	Deuel	Corn	59%	Sugar Beets	12%	Alfalfa	23%	Small Grains	6%
1959	Deuel	Corn	64%	Sugar Beets	10%	Sorghum	5%	Alfalfa	21%
1960	Deuel	Corn	60%	Sugar Beets	15%	Sorghum	6%	Alfalfa	20%
1961	Deuel	Corn	56%	Sugar Beets	19%	Dry Beans	7%	Alfalfa	18%
1962	Deuel	Corn	53%	Sugar Beets	23%	Dry Beans	8%	Alfalfa	16%
1963	Deuel	Corn	50%	Sugar Beets	27%	Dry Beans	9%	Alfalfa	15%
1964	Deuel	Corn	47%	Sugar Beets	30%	Dry Beans	9%	Alfalfa	14%
1965	Deuel	Corn	44%	Sugar Beets	31%	Dry Beans	11%	Alfalfa	14%
1966	Deuel	Corn	43%	Sugar Beets	31%	Dry Beans	13%	Alfalfa	14%
1967	Deuel	Corn	41%	Sugar Beets	31%	Dry Beans	14%	Alfalfa	14%
1968	Deuel	Corn	40%	Sugar Beets	31%	Dry Beans	15%	Alfalfa	14%
1969	Deuel	Corn	40%	Sugar Beets	32%	Dry Beans	15%	Alfalfa	14%
1970	Deuel	Corn	43%	Sugar Beets	28%	Dry Beans	16%	Alfalfa	13%
1971	Deuel	Corn	47%	Sugar Beets	25%	Dry Beans	16%	Alfalfa	12%
1972	Deuel	Corn	49%	Sugar Beets	23%	Dry Beans	16%	Small Grains	12%
1973	Deuel	Corn	51%	Sugar Beets	20%	Dry Beans	16%	Small Grains	13%
1974	Deuel	Corn	53%	Sugar Beets	18%	Dry Beans	16%	Small Grains	14%
1975	Deuel	Corn	55%	Sugar Beets	15%	Dry Beans	16%	Small Grains	14%
1976	Deuel	Corn	57%	Sugar Beets	13%	Dry Beans	15%	Small Grains	15%
1977	Deuel	Corn	58%	Dry Beans	15%	Alfalfa	12%	Small Grains	15%
1978	Deuel	Corn	59%	Dry Beans	14%	Alfalfa	12%	Small Grains	15%
1979	Deuel	Corn	59%	Dry Beans	15%	Alfalfa	11%	Small Grains	16%
1980	Deuel	Corn	59%	Dry Beans	15%	Alfalfa	9%	Small Grains	17%
1981	Deuel	Corn	58%	Dry Beans	16%	Alfalfa	8%	Small Grains	17%
1982	Deuel	Corn	58%	Dry Beans	17%	Alfalfa	7%	Small Grains	18%
1983	Deuel	Corn	57%	Dry Beans	18%	Alfalfa	7%	Small Grains	18%
1984	Deuel	Corn	56%	Dry Beans	18%	Alfalfa	8%	Small Grains	18%
1985	Deuel	Corn	55%	Dry Beans	19%	Alfalfa	8%	Small Grains	18%
1986	Deuel	Corn	53%	Dry Beans	19%	Alfalfa	9%	Small Grains	18%
1987	Deuel	Corn	51%	Dry Beans	20%	Alfalfa	10%	Small Grains	18%
1988	Deuel	Corn	56%	Dry Beans	18%	Alfalfa	9%	Small Grains	17%
1989	Deuel	Corn	61%	Dry Beans	16%	Alfalfa	9%	Small Grains	14%
1990	Deuel	Corn	65%	Dry Beans	14%	Alfalfa	8%	Small Grains	12%
1991	Deuel	Corn	70%	Dry Beans	12%	Alfalfa	7%	Small Grains	10%
1992	Deuel	Corn	76%	Dry Beans	10%	Alfalfa	7%	Small Grains	8%

Table 29: Kimball County Irrigated Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Kimball	Dry Beans	26%	Potatoes	17%	Alfalfa	48%	Small Grains	9%
1954	Kimball	Dry Beans	28%	Potatoes	13%	Alfalfa	50%	Small Grains	9%
1955	Kimball	Corn	12%	Dry Beans	27%	Potatoes	11%	Alfalfa	50%
1956	Kimball	Corn	14%	Dry Beans	26%	Alfalfa	50%	Small Grains	11%
1957	Kimball	Corn	15%	Dry Beans	25%	Alfalfa	49%	Small Grains	11%
1958	Kimball	Corn	16%	Dry Beans	24%	Alfalfa	49%	Small Grains	11%
1959	Kimball	Corn	18%	Dry Beans	23%	Alfalfa	48%	Small Grains	12%
1960	Kimball	Corn	21%	Dry Beans	22%	Alfalfa	47%	Small Grains	11%
1961	Kimball	Corn	24%	Dry Beans	21%	Alfalfa	45%	Small Grains	10%
1962	Kimball	Corn	28%	Dry Beans	20%	Alfalfa	44%	Small Grains	9%
1963	Kimball	Corn	31%	Dry Beans	19%	Alfalfa	43%	Small Grains	8%
1964	Kimball	Corn	34%	Dry Beans	18%	Alfalfa	41%	Small Grains	7%
1965	Kimball	Corn	34%	Dry Beans	18%	Alfalfa	40%	Small Grains	8%
1966	Kimball	Corn	33%	Dry Beans	19%	Alfalfa	40%	Small Grains	9%
1967	Kimball	Corn	32%	Dry Beans	19%	Alfalfa	39%	Small Grains	10%
1968	Kimball	Corn	31%	Dry Beans	19%	Alfalfa	38%	Small Grains	11%
1969	Kimball	Corn	31%	Dry Beans	20%	Alfalfa	38%	Small Grains	12%
1970	Kimball	Corn	29%	Dry Beans	21%	Alfalfa	37%	Small Grains	12%
1971	Kimball	Corn	28%	Dry Beans	22%	Alfalfa	37%	Small Grains	13%
1972	Kimball	Corn	27%	Dry Beans	24%	Alfalfa	36%	Small Grains	13%
1973	Kimball	Corn	25%	Dry Beans	25%	Alfalfa	36%	Small Grains	14%
1974	Kimball	Corn	24%	Dry Beans	27%	Alfalfa	35%	Small Grains	14%
1975	Kimball	Corn	25%	Dry Beans	27%	Alfalfa	33%	Small Grains	15%
1976	Kimball	Corn	26%	Dry Beans	27%	Alfalfa	31%	Small Grains	15%
1977	Kimball	Corn	27%	Dry Beans	27%	Alfalfa	30%	Small Grains	16%
1978	Kimball	Corn	28%	Dry Beans	27%	Alfalfa	29%	Small Grains	16%
1979	Kimball	Corn	28%	Dry Beans	28%	Alfalfa	26%	Small Grains	18%
1980	Kimball	Corn	28%	Dry Beans	29%	Alfalfa	24%	Small Grains	20%
1981	Kimball	Corn	28%	Dry Beans	29%	Alfalfa	21%	Small Grains	22%
1982	Kimball	Corn	28%	Dry Beans	30%	Alfalfa	19%	Small Grains	23%
1983	Kimball	Corn	28%	Dry Beans	29%	Alfalfa	20%	Small Grains	23%
1984	Kimball	Corn	29%	Dry Beans	28%	Alfalfa	20%	Small Grains	23%
1985	Kimball	Corn	30%	Dry Beans	28%	Alfalfa	20%	Small Grains	22%
1986	Kimball	Corn	31%	Dry Beans	27%	Alfalfa	20%	Small Grains	22%
1987	Kimball	Corn	32%	Dry Beans	26%	Alfalfa	20%	Small Grains	21%
1988	Kimball	Corn	35%	Dry Beans	25%	Alfalfa	20%	Small Grains	20%
1989	Kimball	Corn	38%	Dry Beans	23%	Alfalfa	20%	Small Grains	18%
1990	Kimball	Corn	40%	Dry Beans	22%	Alfalfa	20%	Small Grains	17%
1991	Kimball	Corn	43%	Dry Beans	21%	Alfalfa	20%	Small Grains	16%
1992	Kimball	Corn	45%	Dry Beans	19%	Alfalfa	20%	Small Grains	15%

Table 30: Cheyenne County Dryland Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Cheyenne	Corn	1%	Sorghum	2%	Small Grains	49%	Summer Fallow	48%
1954	Cheyenne	Corn	1%	Sorghum	2%	Small Grains	48%	Summer Fallow	48%
1955	Cheyenne	Corn	1%	Sorghum	3%	Small Grains	48%	Summer Fallow	49%
1956	Cheyenne	Corn	1%	Sorghum	3%	Small Grains	47%	Summer Fallow	49%
1957	Cheyenne	Corn	1%	Sorghum	3%	Small Grains	47%	Summer Fallow	49%
1958	Cheyenne	Corn	1%	Sorghum	3%	Small Grains	46%	Summer Fallow	49%
1959	Cheyenne	Corn	1%	Sorghum	4%	Small Grains	46%	Summer Fallow	49%
1960	Cheyenne	Corn	1%	Sorghum	3%	Small Grains	45%	Summer Fallow	50%
1961	Cheyenne	Corn	1%	Sorghum	3%	Small Grains	45%	Summer Fallow	51%
1962	Cheyenne	Corn	1%	Sorghum	3%	Small Grains	44%	Summer Fallow	52%
1963	Cheyenne	Corn	1%	Sorghum	2%	Small Grains	43%	Summer Fallow	54%
1964	Cheyenne	Corn	1%	Sorghum	2%	Small Grains	42%	Summer Fallow	55%
1965	Cheyenne	Corn	1%	Sorghum	2%	Small Grains	43%	Summer Fallow	54%
1966	Cheyenne	Corn	1%	Sorghum	1%	Small Grains	44%	Summer Fallow	54%
1967	Cheyenne	Corn	1%	Sorghum	1%	Small Grains	45%	Summer Fallow	53%
1968	Cheyenne	Sorghum	1%	Alfalfa	1%	Small Grains	46%	Summer Fallow	53%
1969	Cheyenne	Sorghum	1%	Alfalfa	1%	Small Grains	46%	Summer Fallow	52%
1970	Cheyenne	Sorghum	1%	Alfalfa	1%	Small Grains	47%	Summer Fallow	52%
1971	Cheyenne	Sorghum	1%	Alfalfa	1%	Small Grains	48%	Summer Fallow	51%
1972	Cheyenne	Sorghum	1%	Alfalfa	1%	Small Grains	48%	Summer Fallow	50%
1973	Cheyenne	Sorghum	0%	Alfalfa	1%	Small Grains	49%	Summer Fallow	50%
1974	Cheyenne	Corn	0%	Alfalfa	1%	Small Grains	50%	Summer Fallow	49%
1975	Cheyenne	Sorghum	0%	Alfalfa	1%	Small Grains	49%	Summer Fallow	50%
1976	Cheyenne	Sorghum	0%	Alfalfa	1%	Small Grains	49%	Summer Fallow	50%
1977	Cheyenne	Sorghum	0%	Alfalfa	0%	Small Grains	48%	Summer Fallow	51%
1978	Cheyenne	Sorghum	0%	Alfalfa	0%	Small Grains	48%	Summer Fallow	52%
1979	Cheyenne	Sorghum	0%	Alfalfa	0%	Small Grains	48%	Summer Fallow	52%
1980	Cheyenne	Sorghum	0%	Alfalfa	0%	Small Grains	48%	Summer Fallow	52%
1981	Cheyenne	Corn	0%	Alfalfa	0%	Small Grains	48%	Summer Fallow	52%
1982	Cheyenne	Corn	0%	Alfalfa	0%	Small Grains	48%	Summer Fallow	52%
1983	Cheyenne	Corn	0%	Alfalfa	0%	Small Grains	47%	Summer Fallow	52%
1984	Cheyenne	Corn	1%	Alfalfa	1%	Small Grains	46%	Summer Fallow	53%
1985	Cheyenne	Corn	1%	Alfalfa	1%	Small Grains	45%	Summer Fallow	53%
1986	Cheyenne	Corn	1%	Dry Beans	1%	Small Grains	45%	Summer Fallow	54%
1987	Cheyenne	Corn	1%	Dry Beans	1%	Small Grains	44%	Summer Fallow	54%
1988	Cheyenne	Corn	1%	Dry Beans	1%	Small Grains	44%	Summer Fallow	55%
1989	Cheyenne	Corn	1%	Small Grains	44%	Sunflower	1%	Summer Fallow	55%
1990	Cheyenne	Corn	1%	Small Grains	43%	Sunflower	1%	Summer Fallow	55%
1991	Cheyenne	Corn	1%	Small Grains	43%	Sunflower	1%	Summer Fallow	55%
1992	Cheyenne	Corn	1%	Small Grains	43%	Sunflower	1%	Summer Fallow	55%

Table 31: Deuel County Dryland Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Deuel	Corn	2%	Sorghum	5%	Small Grains	47%	Summer Fallow	45%
1954	Deuel	Corn	2%	Sorghum	6%	Small Grains	46%	Summer Fallow	45%
1955	Deuel	Corn	2%	Sorghum	6%	Small Grains	46%	Summer Fallow	46%
1956	Deuel	Corn	2%	Sorghum	7%	Small Grains	45%	Summer Fallow	46%
1957	Deuel	Corn	2%	Sorghum	7%	Small Grains	44%	Summer Fallow	46%
1958	Deuel	Corn	2%	Sorghum	8%	Small Grains	44%	Summer Fallow	47%
1959	Deuel	Corn	2%	Sorghum	8%	Small Grains	43%	Summer Fallow	47%
1960	Deuel	Corn	2%	Sorghum	7%	Small Grains	42%	Summer Fallow	48%
1961	Deuel	Corn	2%	Sorghum	7%	Small Grains	42%	Summer Fallow	50%
1962	Deuel	Corn	2%	Sorghum	6%	Small Grains	41%	Summer Fallow	51%
1963	Deuel	Corn	1%	Sorghum	5%	Small Grains	41%	Summer Fallow	53%
1964	Deuel	Corn	1%	Sorghum	5%	Small Grains	40%	Summer Fallow	54%
1965	Deuel	Corn	1%	Sorghum	4%	Small Grains	42%	Summer Fallow	53%
1966	Deuel	Corn	1%	Sorghum	3%	Small Grains	44%	Summer Fallow	52%
1967	Deuel	Corn	1%	Sorghum	3%	Small Grains	46%	Summer Fallow	51%
1968	Deuel	Corn	1%	Sorghum	2%	Small Grains	48%	Summer Fallow	50%
1969	Deuel	Sorghum	1%	Alfalfa	0%	Small Grains	49%	Summer Fallow	49%
1970	Deuel	Sorghum	1%	Alfalfa	0%	Small Grains	50%	Summer Fallow	49%
1971	Deuel	Sorghum	1%	Alfalfa	0%	Small Grains	50%	Summer Fallow	49%
1972	Deuel	Sorghum	1%	Alfalfa	0%	Small Grains	50%	Summer Fallow	49%
1973	Deuel	Sorghum	1%	Alfalfa	0%	Small Grains	50%	Summer Fallow	49%
1974	Deuel	Sorghum	1%	Alfalfa	0%	Small Grains	50%	Summer Fallow	49%
1975	Deuel	Corn	1%	Sorghum	1%	Small Grains	49%	Summer Fallow	50%
1976	Deuel	Corn	1%	Sorghum	1%	Small Grains	47%	Summer Fallow	52%
1977	Deuel	Corn	1%	Sorghum	1%	Small Grains	45%	Summer Fallow	53%
1978	Deuel	Corn	2%	Sorghum	0%	Small Grains	43%	Summer Fallow	55%
1979	Deuel	Corn	1%	Sorghum	0%	Small Grains	45%	Summer Fallow	54%
1980	Deuel	Corn	1%	Sorghum	1%	Small Grains	46%	Summer Fallow	52%
1981	Deuel	Corn	0%	Sorghum	1%	Small Grains	48%	Summer Fallow	51%
1982	Deuel	Sorghum	1%	Alfalfa	0%	Small Grains	49%	Summer Fallow	50%
1983	Deuel	Sorghum	1%	Dry Beans	0%	Small Grains	49%	Summer Fallow	50%
1984	Deuel	Sorghum	1%	Dry Beans	0%	Small Grains	48%	Summer Fallow	51%
1985	Deuel	Sorghum	1%	Dry Beans	1%	Small Grains	48%	Summer Fallow	51%
1986	Deuel	Sorghum	1%	Dry Beans	1%	Small Grains	47%	Summer Fallow	51%
1987	Deuel	Corn	1%	Dry Beans	1%	Small Grains	46%	Summer Fallow	52%
1988	Deuel	Corn	1%	Dry Beans	1%	Small Grains	46%	Summer Fallow	52%
1989	Deuel	Corn	1%	Small Grains	45%	Sunflower	1%	Summer Fallow	53%
1990	Deuel	Corn	1%	Small Grains	44%	Sunflower	1%	Summer Fallow	53%
1991	Deuel	Corn	1%	Small Grains	44%	Sunflower	2%	Summer Fallow	54%
1992	Deuel	Corn	2%	Small Grains	43%	Sunflower	2%	Summer Fallow	54%

Table 32: Kimball County Dryland Crop Mix

Year	County	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Kimball	Corn	1%	Sorghum	2%	Small Grains	34%	Summer Fallow	64%
1954	Kimball	Corn	1%	Sorghum	2%	Small Grains	27%	Summer Fallow	70%
1955	Kimball	Corn	1%	Sorghum	2%	Small Grains	32%	Summer Fallow	65%
1956	Kimball	Corn	1%	Sorghum	2%	Small Grains	37%	Summer Fallow	61%
1957	Kimball	Corn	1%	Sorghum	1%	Small Grains	41%	Summer Fallow	57%
1958	Kimball	Corn	1%	Sorghum	1%	Small Grains	45%	Summer Fallow	54%
1959	Kimball	Corn	1%	Sorghum	0%	Small Grains	48%	Summer Fallow	51%
1960	Kimball	Corn	1%	Sorghum	1%	Small Grains	47%	Summer Fallow	51%
1961	Kimball	Corn	1%	Sorghum	1%	Small Grains	47%	Summer Fallow	52%
1962	Kimball	Corn	0%	Sorghum	1%	Small Grains	46%	Summer Fallow	53%
1963	Kimball	Corn	0%	Sorghum	1%	Small Grains	45%	Summer Fallow	54%
1964	Kimball	Sorghum	1%	Alfalfa	0%	Small Grains	44%	Summer Fallow	55%
1965	Kimball	Sorghum	1%	Alfalfa	0%	Small Grains	44%	Summer Fallow	55%
1966	Kimball	Sorghum	1%	Alfalfa	0%	Small Grains	45%	Summer Fallow	54%
1967	Kimball	Sorghum	1%	Alfalfa	0%	Small Grains	45%	Summer Fallow	54%
1968	Kimball	Sorghum	1%	Alfalfa	0%	Small Grains	46%	Summer Fallow	53%
1969	Kimball	Sorghum	1%	Alfalfa	0%	Small Grains	47%	Summer Fallow	52%
1970	Kimball	Sorghum	1%	Alfalfa	0%	Small Grains	47%	Summer Fallow	52%
1971	Kimball	Sorghum	0%	Alfalfa	0%	Small Grains	48%	Summer Fallow	51%
1972	Kimball	Sorghum	0%	Alfalfa	0%	Small Grains	49%	Summer Fallow	51%
1973	Kimball	Corn	0%	Sorghum	0%	Small Grains	49%	Summer Fallow	50%
1974	Kimball	Corn	0%	Alfalfa	0%	Small Grains	50%	Summer Fallow	50%
1975	Kimball	Corn	0%	Alfalfa	0%	Small Grains	49%	Summer Fallow	51%
1976	Kimball	Corn	0%	Alfalfa	0%	Small Grains	48%	Summer Fallow	52%
1977	Kimball	Corn	0%	Alfalfa	0%	Small Grains	46%	Summer Fallow	53%
1978	Kimball	Corn	0%	Alfalfa	0%	Small Grains	45%	Summer Fallow	54%
1979	Kimball	Corn	0%	Alfalfa	0%	Small Grains	45%	Summer Fallow	54%
1980	Kimball	Corn	0%	Alfalfa	0%	Small Grains	45%	Summer Fallow	54%
1981	Kimball	Dry Beans	0%	Alfalfa	0%	Small Grains	45%	Summer Fallow	54%
1982	Kimball	Dry Beans	0%	Alfalfa	0%	Small Grains	46%	Summer Fallow	54%
1983	Kimball	Alfalfa	0%	Small Grains	46%	Sunflower	0%	Summer Fallow	53%
1984	Kimball	Alfalfa	0%	Small Grains	46%	Sunflower	1%	Summer Fallow	53%
1985	Kimball	Alfalfa	0%	Small Grains	47%	Sunflower	1%	Summer Fallow	52%
1986	Kimball	Alfalfa	0%	Small Grains	47%	Sunflower	1%	Summer Fallow	51%
1987	Kimball	Alfalfa	0%	Small Grains	48%	Sunflower	2%	Summer Fallow	50%
1988	Kimball	Alfalfa	1%	Small Grains	47%	Sunflower	2%	Summer Fallow	51%
1989	Kimball	Alfalfa	1%	Small Grains	47%	Sunflower	2%	Summer Fallow	51%
1990	Kimball	Dry Beans	1%	Small Grains	47%	Sunflower	2%	Summer Fallow	51%
1991	Kimball	Dry Beans	1%	Small Grains	46%	Sunflower	1%	Summer Fallow	52%
1992	Kimball	Dry Beans	1%	Small Grains	46%	Sunflower	1%	Summer Fallow	52%

Table 33: Wyoming Crop Distribution Summary

Year	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent	Crop Type	Percent
1953	Sugar Beets	23%	Dry Beans	25%	Alfalfa	33%	Small Grains	19%
1954	Sugar Beets	23%	Dry Beans	29%	Alfalfa	28%	Grass Pasture	20%
1955	Corn	18%	Sugar Beets	22%	Dry Beans	24%	Alfalfa	36%
1956	Corn	18%	Sugar Beets	26%	Alfalfa	37%	Small Grains	19%
1957	Corn	32%	Sugar Beets	21%	Dry Beans	19%	Alfalfa	28%
1958	Corn	26%	Sugar Beets	23%	Dry Beans	19%	Alfalfa	32%
1959	Corn	31%	Sugar Beets	24%	Dry Beans	19%	Alfalfa	26%
1960	Corn	30%	Sugar Beets	24%	Alfalfa	25%	Small Grains	21%
1961	Corn	34%	Sugar Beets	27%	Alfalfa	24%	Small Grains	15%
1962	Corn	28%	Sugar Beets	23%	Dry Beans	22%	Alfalfa	27%
1963	Corn	24%	Sugar Beets	26%	Dry Beans	22%	Alfalfa	28%
1964	Corn	26%	Sugar Beets	23%	Alfalfa	28%	Grass Pasture	23%
1965	Corn	27%	Dry Beans	22%	Alfalfa	28%	Grass Pasture	23%
1966	Corn	25%	Dry Beans	23%	Alfalfa	28%	Grass Pasture	24%
1967	Corn	31%	Dry Beans	20%	Alfalfa	27%	Grass Pasture	22%
1968	Corn	28%	Sugar Beets	22%	Alfalfa	28%	Grass Pasture	22%
1969	Corn	28%	Sugar Beets	22%	Alfalfa	28%	Grass Pasture	22%
1970	Corn	30%	Dry Beans	21%	Alfalfa	27%	Grass Pasture	22%
1971	Corn	28%	Sugar Beets	21%	Alfalfa	27%	Grass Pasture	24%
1972	Corn	29%	Sugar Beets	23%	Alfalfa	24%	Grass Pasture	24%
1973	Corn	32%	Sugar Beets	22%	Alfalfa	26%	Grass Pasture	20%
1974	Corn	32%	Sugar Beets	24%	Alfalfa	24%	Grass Pasture	20%
1975	Corn	29%	Sugar Beets	26%	Alfalfa	24%	Grass Pasture	21%
1976	Corn	33%	Sugar Beets	26%	Alfalfa	22%	Grass Pasture	19%
1977	Corn	35%	Sugar Beets	23%	Alfalfa	25%	Grass Pasture	17%
1978	Corn	39%	Sugar Beets	19%	Alfalfa	24%	Grass Pasture	18%
1979	Corn	39%	Sugar Beets	19%	Alfalfa	24%	Grass Pasture	18%
1980	Corn	39%	Sugar Beets	20%	Dry Beans	18%	Alfalfa	23%
1981	Corn	33%	Sugar Beets	19%	Dry Beans	19%	Alfalfa	29%
1982	Corn	40%	Sugar Beets	20%	Alfalfa	25%	Grass Pasture	15%
1983	Corn	56%	Dry Beans	9%	Alfalfa	23%	Grass Pasture	12%
1984	Corn	53%	Sugar Beets	12%	Dry Beans	13%	Alfalfa	22%
1985	Corn	56%	Sugar Beets	12%	Alfalfa	21%	Grass Pasture	11%
1986	Corn	44%	Dry Beans	14%	Alfalfa	28%	Grass Pasture	14%
1987	Corn	40%	Dry Beans	15%	Alfalfa	29%	Grass Pasture	16%
1988	Corn	45%	Sugar Beets	14%	Alfalfa	28%	Grass Pasture	13%
1989	Corn	45%	Sugar Beets	17%	Alfalfa	22%	Grass Pasture	16%
1990	Corn	37%	Sugar Beets	18%	Dry Beans	17%	Alfalfa	28%
1991	Corn	40%	Sugar Beets	19%	Dry Beans	16%	Alfalfa	25%
1992	Corn	37%	Sugar Beets	22%	Alfalfa	27%	Grass Pasture	14%
1993	Corn	43%	Sugar Beets	19%	Alfalfa	26%	Grass Pasture	12%
1994	Corn	42%	Dry Beans	14%	Alfalfa	28%	Grass Pasture	16%

Appendix D: Interim Datasets

WWUM Model Irrigated & Dryland Acreage Assessment

Appendix D – Interim Coverages

Eight irrigated and dryland acreage assessments were developed in the North Platte and South Platte NRD areas for the assessment years of 1953, 1975/1977, 1984, 1993, 1997, 2001, 2005 and 2010. Estimating the changes to irrigated and dryland acreage for the interim periods between the assessment years is necessary to quantify the net irrigation requirement (NIR), historical pumping and irrigation recharge for the entire 1953 to 2010 study period.

Historically, surface water only lands remain fairly constant, and the primary changes to the basin are the result of ground water development (i.e. certification of acreage served by ground water). In order to estimate when the certification of acres occurred, each certified parcel was attributed with a "First Irrigation" date indicating the year that the parcel first received a ground water supply. **Appendix A and B** discuss certified acreage and First Irrigation dates in more detail. These First Irrigation dates were used to construct the interim coverages between the assessment year coverages, as discussed below.

Approach

In general, an approach of carrying forward parcel boundaries and attributes for both irrigated and dryland parcels, until a change in boundaries or attributes is known, was used to develop the interim coverages. For surface water parcels, this change was generally seen when the parcel was historically flood irrigated (i.e. rectangular boundary) to sprinkler irrigated (i.e. circular boundary). Specific information as to the year of this irrigation application change is not known, so these changes in parcel boundaries due to irrigation practices appear to take place at the assessment years.

For ground water parcels, specific information as to the year of ground water development is known with First Irrigation dates, therefore this information was able to implemented in the interim coverages, not just in the assessment years. For a surface water parcel that began to receive ground water in the interim year of 1980, the attribution of that parcel reflected the co-mingled attribution in the 1980 coverage however retained the same parcel boundary from the previous assessment year. For a ground water only parcel that was brought into production in 1992, the parcel boundary from the first assessment year that it appears (1993 in this case) was "borrowed" and included in the 1992 coverage with the appropriate certificate number and attribution. If this ground water parcel in brought into production on a previously dryland parcel, the dryland parcel was eliminated and replaced with the irrigated parcel in the 1992 coverage.

Standardization of the attribute table formats in each assessment coverage and the ESRI GIS Model Builder tool allowed for the interim coverages to be automated in their development. The number of certified parcels, and their associated acreage, in each interim coverage was then reviewed based on the First Irrigation data. Note that the interim coverages are topological correct without overlapping polygons, however they do not represent an interpretation of historical imagery and should not be compared to such.

GIS tools were built to iteratively process datasets between each assessment year, however due to differences in the certification process for each NRD, a separate set of tools was developed to

account for each NRDs attributes and irrigated and dryland coverages. There are three general steps when using the GIS tools, as discussed below.

Step 1 - Creation of the Interim Coverage

Once the assessment years were developed, they were then used as the basis for developing the interim coverages. Irrigated parcels were considered first by the tool. For each interim coverage, the tool first looks to the past assessment year (e.g. 1975 for the 1980 interim year) and selects the irrigated parcels to be carried forward to the interim coverage. The tool then looks to the next assessment year (e.g. 1984 for the 1980 interim year) to determine which new ground water and co-mingled parcels are in the next assessment year and what their First Irrigation dates are. GIS tools then combine the irrigated parcels carried forward and the parcels with First Irrigation dates that match the interim year to create the base interim coverage.

1954 Interim Coverage Example:

1. Irrigated parcels from the 1953 assessment year coverage were selected to be carried forward.
2. Ground water only and co-mingled parcels with "First Irrigation" dates equal 1954 were selected from the 1975 assessment year coverage.
3. The selected parcels from 1975 were then combined spatially using the *Union* tool with the 1953 irrigated parcels creating the 1954 interim coverage.
4. For parcels that overlap, the *Union* tool in the previous step creates two sets of attributes. The attributes from the 1953 parcels that overlap 1975 parcels were queried and eliminated so that the parcel would retain the 1975 parcel attributes with the 1954 First Irrigation date.

Step 2 – Interim Topology

As new irrigated parcels come under production or change over time, the geometry or topology between irrigated parcels and dryland parcels changes. To correct for these changes, a tool was developed to remove dryland areas overlapping an irrigated parcel. Using the previous example, dryland parcels from 1953 were carried forward to the 1954 interim coverage, and the tool checked for and removed dryland parcels that overlapped with newly added irrigated parcels.

Step 3 – Interim Attribution

Polygon geometry, and the area encompassed by the polygon, also changes as parcels are added to interim coverages. To correctly account for these changes in the attribute table, a tool was developed to re-calculate "Acres", "Parcel_ID", and "Cal_Year" to correctly reflect the parcels and coverage included in each interim year.

The GIS tools were created using ESRI ArcMap 9.0 version and code in the Python language. The Python code behind the tools is included at the end of this appendix. The automated process can be re-executed if any revisions are made to the certified acreage or assessment year coverages. In general, the GIS tools generate coverages complete with attributes, specific to each NRD as discussed in the main report. The exception to this is the historical crop assignments for the 1984 through 1953 coverages and the incorporation of recent year-specific information (e.g. pumping records, field-specific crop points, retired parcels) available from 2005 through 2010.

Interim Crop Assignments

For the interim years between 1993 and 2005, the crop assignments, originally from CALMIT Land Use coverages, from the assessment years were carried forward through the interim coverages. As discussed in **Appendix C – Crop Assignments**, year-specific crop information from *Post-Decree Changes in the Water Supply and Irrigation Development in the North Platte River Valley* report by Dr. Darrel Martin (February, 2000) and National Agricultural Statistical Service (NASS) were used to assign crop information for the 1953 through 1992 period. This year-specific information was post-processed, or attributed outside of the GIS tools, after the interim coverages were developed. In addition, field-specific crop information available from CropScape and the NRDs in more recent years was post-processed and attributed explicitly to the 2006 through 2009 interim coverages.

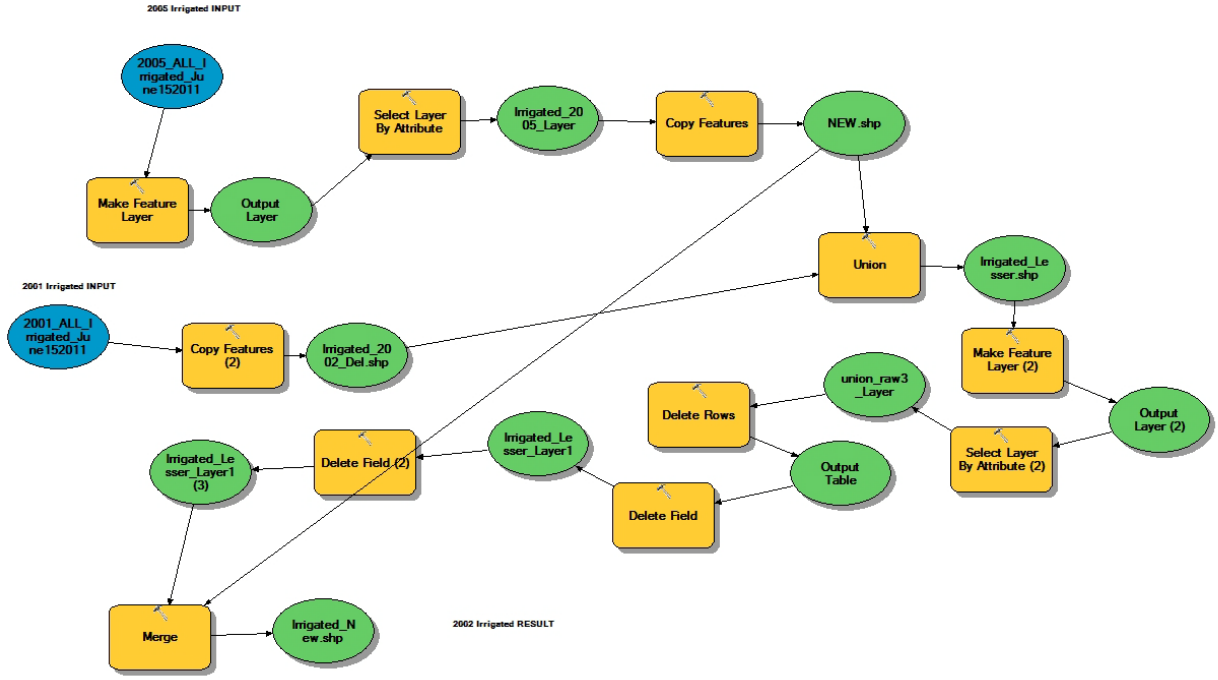
Recent Interim Coverage Development (2006 – 2009)

Information on water use, cropping patterns, and retired lands is available annually from the NRDs for post-2005 years. Due to the complexity of incorporating this information using the GIS tools, the development of the 2006 through 2009 interim coverages was completed manually using the same methodologies used to develop the 2010 assessment year coverage. **Appendix A and B** discuss the use of inactive pumping records and CREP/EQIP lands to complete the interim acreage assessments 2006 through 2009.

GIS Tool Code

The python code associated with each of the tools is included below.

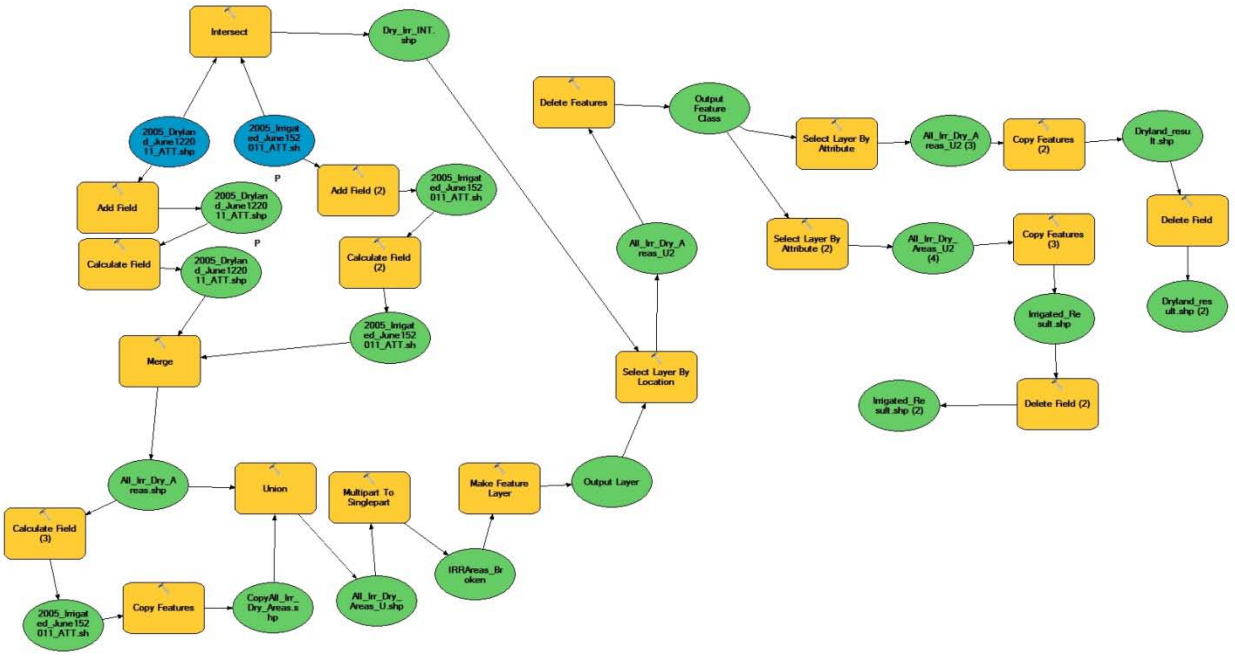
NPNRD Interim Irrigated Tool




```
# ---------------------------------------------------------------------------
# INTERIM.py
# Created on: 2011-06-23 15:36:28.00000
#   (generated by ArcGIS/ModelBuilder)
# Description: This script is use to generate interim irrigated shapefiles.
# ---------------------------------------------------------------------------
# Import arcpy module
import arcpy
# Local variables:
Ginput = arcpy.GetParameterAsText(0)
Linput = arcpy.GetParameterAsText(1)
WORKSPACE = arcpy.GetParameterAsText(2)
SQL = arcpy.GetParameterAsText(3)
Greater_Copy = str(WORKSPACE) + "\\Greater_Copy.shp"
CO_and_GW_Stats_shp = str(WORKSPACE) + "\\Comingled_GW_Stats.shp"
Irrigated_2005_Layer = "Ginput"
NEW_shp = str(WORKSPACE) + "\\NEW.shp"
Irrigated_Interim_Del = str(WORKSPACE) + "\\Irrigated_Interim_Del.shp"
Irrigated_Lesser_shp = str(WORKSPACE) + "\\Irrigated_Lesser.shp"
Output_Layer__2_ = str(WORKSPACE) + "\\Irrigated_Lesser1.shp"
Output_Layer__3_ = str(WORKSPACE) + "\\Irrigated_INTERIM_resultwf.shp"
Irrigated_New_shp = str(WORKSPACE) + "\\Irrigated_INTERIM_result.shp"
# Process: Copy Features (2)
arcpy.CopyFeatures_management(Linput, Irrigated_Interim_Del, "", "0", "0", "0")
# Process: Make Feature Layer
arcpy.MakeFeatureLayer_management(Ginput, Greater_Copy, "", "", "")
# Process: Select Layer By Attribute
arcpy.SelectLayerByAttribute_management(Greater_Copy, "NEW_SELECTION", SQL)
# Process: Copy Features
arcpy.CopyFeatures_management(Greater_Copy, NEW_shp, "", "0", "0", "0")
# Process: Union
arcpy.Union_analysis([Irrigated_Interim_Del, NEW_shp], Irrigated_Lesser_shp, "ALL", "", "GAPS")
```

 # Process: Make Feature Layer (2)
arcpy.MakeFeatureLayer_management(Irrigated_Lesser_shp, Output_Layer__2_, "", "", "")
 # Process: Select Layer By Attribute
arcpy.SelectLayerByAttribute_management(Output_Layer__2_, "NEW_SELECTION", "NOT CAL_YEAR_1 = 0")
 # Process: Delete Rows
arcpy.DeleteRows_management(Output_Layer__2_)
 # Process: Delete Field
arcpy.DeleteField_management(Output_Layer__2_, "FID_Irriga;FID_NEW;PARCEL_I_1;CAL_YEAR_1;ACRES_1;IRR_TYPE_1;SW_1;GW_1;ID_1;FIRST_IR_1;CERT_ACT_1;SOURCE_1;SW_FAC_1;PERMIT_N_1;COUNTY_1;URF_ID_1;SUBAREA_1;CROP1_1;CROP1_CO_1;CROP2_1;CROP2_CO_1;CROP3_1;CROP3_CO_1;CROP4_1;CROP4_CO_1;CRP_SRC_1")
 # Process: Merge
arcpy.Merge_management([NEW_shp, Irrigated_Lesser_shp], Irrigated_New_shp, "")
 # Process: Calculate Field
arcpy.CalculateField_management(Irrigated_New_shp, "Acres", "\" !shape.area@acres!\"", "PYTHON_9.3", "")
 # Process: Make Feature Layer (2)
arcpy.MakeFeatureLayer_management(Irrigated_New_shp, Output_Layer__3_, "", "", "")
 # Process: Select Layer By Attribute
arcpy.SelectLayerByAttribute_management(Output_Layer__3_, "NEW_SELECTION", "\"Acres\" < .5")
 # Delete Rows with Less than .5 Acres in the Parcel
arcpy.DeleteRows_management(Output_Layer__3_)
arcpy.DeleteField_management(Output_Layer__3_, "Irr_Dry")
 # Generate Statistics shapefile for QC of co-mingled and GW only parcels.
arcpy.CalculateField_management(NEW_shp, "Acres", "\" !shape.area@acres!\"", "PYTHON_9.3", "")
arcpy.Dissolve_management (NEW_shp, CO_and_GW_Stats_shp, "ID", "ACRES SUM;ID COUNT", "MULTI_PART", "DISSOLVE_LINES")
 # Process: Table to dBASE (multiple)
arcpy.TableToDBASE_conversion(CO_and_GW_Stats_shp, WORKSPACE)
 # Delete Intermediate Data:
arcpy.Delete_management(NEW_shp)
arcpy.Delete_management(Irrigated_Lesser_shp)
arcpy.Delete_management(Irrigated_Interim_Del)
arcpy.Delete_management(CO_and_GW_Stats_shp)

NPNRD Interim Topology Tool




```
# ---------------------------------------------------------------------------
# Topology3.py
# Created on: 2011-06-22 13:10:01.00000
# (generated by ArcGIS/ModelBuilder)
# Description:  This script is used to generate interim dryland shapefiles by removing intersecting irrigated
#  polygons
# ---------------------------------------------------------------------------
# Import arcpy module
import arcpy
from arcpy import *
# Local variables:
IRRIGATED = arcpy.GetParameterAsText(0)
DRYLAND = arcpy.GetParameterAsText(1)
WORKSPACE = arcpy.GetParameterAsText(2)
All_Irr_Dry_Areas = str(WORKSPACE) + "\\All_Irr_Dry_Areas.shp"
All_Irr_Dry_Areas_U__2_ = str(WORKSPACE) + "\\All_Irr_Dry_Areas_U.shp"
Dry_Irr_INT = str(WORKSPACE) + "\\Dry_Irr_INT.shp"
All_Irr_Dry_Areas_U = str(WORKSPACE) + "\\All_Irr_Dry_Areas_U.shp"
IRRAreas_Broken = str(WORKSPACE) + "\\All_Irr_Dry_Areas_U2.shp"
CopyAll_Irr_Dry_Areas =str(WORKSPACE) +  "\\CopyAll_Irr_Dry_Areas.shp"
Dryland_result_shp = str(WORKSPACE) + "\\Dryland_result.shp"
Irrigated_Result_shp = str(WORKSPACE) + "\\Irrigated_Result.shp"
Output_Layer = str(WORKSPACE) + "\\All_Irr_Dry_Areas_U_layer"
# Process: Add Field
arcpy.AddField_management(DRYLAND, "Irr_Dry", "TEXT", "", "", "50", "", "NON_NULLABLE",
"NON_REQUIRED", "")
# Process: Calculate Field
arcpy.CalculateField_management(DRYLAND, "Irr_Dry", "\"DRYLAND\"", "VB", "")
# Process: Add Field (2)
arcpy.AddField_management(IRRIGATED, "Irr_Dry", "TEXT", "", "", "50", "", "NON_NULLABLE",
"NON_REQUIRED", "")
# Process: Calculate Field (2)
```

arcpy.CalculateField_management(IRRIGATED, "Irr_Dry", "\"IRRIGATED\"", "VB", "")
 # Process: Merge
arcpy.Merge_management([DRYLAND, IRRIGATED], All_Irr_Dry_Areas, "")
 # Process: Calculate Field (3)
#arcpy.CalculateField_management(All_Irr_Dry_Areas_shp, "PARCEL_ID", "[FID] + 1", "VB", "")
 # Process: Copy Features
arcpy.CopyFeatures_management(All_Irr_Dry_Areas, CopyAll_Irr_Dry_Areas, "", "0", "0", "0")
 # Process: Union
arcpy.Union_analysis([All_Irr_Dry_Areas, CopyAll_Irr_Dry_Areas], All_Irr_Dry_Areas_U, "ALL", "", "GAPS")
 # Process: Multipart To Singlepart
arcpy.MultipartToSinglepart_management(All_Irr_Dry_Areas_U, IRRAreas_Broken)
 # Process: Intersect
arcpy.Intersect_analysis([DRYLAND, IRRIGATED], Dry_Irr_INT, "ALL", "", "INPUT")
 # Process: Make Feature Layer
arcpy.MakeFeatureLayer_management(All_Irr_Dry_Areas_U, Output_Layer, "", "", "FID FID VISIBLE NONE;FID_CopyAl FID_CopyAl VISIBLE NONE;Shape Shape VISIBLE NONE;Parcel_ID Parcel_ID VISIBLE NONE;Cal_Year Cal_Year VISIBLE NONE;Acres Acres VISIBLE NONE;URF_ID URF_ID VISIBLE NONE;Subarea Subarea VISIBLE NONE;County County VISIBLE NONE;Irr_Dry Irr_Dry VISIBLE NONE;ID ID VISIBLE NONE;IRRIGATION IRRIGATION VISIBLE NONE;SOURCE SOURCE VISIBLE NONE;IRR_TYPE IRR_TYPE VISIBLE NONE;SUB_ID SUB_ID VISIBLE NONE;CERT_ACTIV CERT_ACTIV VISIBLE NONE;FIRST_IRR FIRST_IRR VISIBLE NONE;SW SW VISIBLE NONE;GW GW VISIBLE NONE;SW_FACILIT SW_FACILIT VISIBLE NONE;NAME NAME VISIBLE NONE;SHAPE_AREA SHAPE_AREA VISIBLE NONE;IMAGE IMAGE VISIBLE NONE;PERMIT_NO PERMIT_NO VISIBLE NONE;MODEL_YR MODEL_YR VISIBLE NONE;Parcel_I_1 Parcel_I_1 VISIBLE NONE;Cal_Year_1 Cal_Year_1 VISIBLE NONE;Acres_1 Acres_1 VISIBLE NONE;URF_ID_1 URF_ID_1 VISIBLE NONE;Subarea_1 Subarea_1 VISIBLE NONE;County_1 County_1 VISIBLE NONE;Irr_Dry_1 Irr_Dry_1 VISIBLE NONE;ID_1 ID_1 VISIBLE NONE;IRRIGATI_1 IRRIGATI_1 VISIBLE NONE;SOURCE_1 SOURCE_1 VISIBLE NONE;IRR_TYPE_1 IRR_TYPE_1 VISIBLE NONE;SUB_ID_1 SUB_ID_1 VISIBLE NONE;CERT_ACT_1 CERT_ACT_1 VISIBLE NONE;FIRST_IR_1 FIRST_IR_1 VISIBLE NONE;SW_1 SW_1 VISIBLE NONE;GW_1 GW_1 VISIBLE NONE;SW_FACIL_1 SW_FACIL_1 VISIBLE NONE;NAME_1 NAME_1 VISIBLE NONE;SHAPE_AR_1 SHAPE_AR_1 VISIBLE NONE;IMAGE_1 IMAGE_1 VISIBLE NONE;PERMIT_N_1 PERMIT_N_1 VISIBLE NONE;MODEL_YR_1 MODEL_YR_1 VISIBLE NONE;ORIG_FID ORIG_FID VISIBLE NONE")
 # Process: Select Layer By Location
arcpy.SelectLayerByLocation_management(Output_Layer, "ARE_IDENTICAL_TO", Dry_Irr_INT, "", "NEW_SELECTION")
 # Process: Add Field (2)
arcpy.AddField_management(Output_Layer, "Delete", "TEXT", "", "", "50", "", "NON_NULLABLE", "NON_REQUIRED", "")
 # Process: Calculate Field (2)
arcpy.CalculateField_management(Output_Layer, "Delete", "\"DEL\"", "VB", "")
 # Select by Attributes
arcpy.SelectLayerByAttribute_management(Output_Layer, "NEW_SELECTION", "\"Delete\" = 'DEL'")
 # Process: Delete Features
arcpy.DeleteFeatures_management(Output_Layer)
 # Process: Select Layer By Attribute
arcpy.SelectLayerByAttribute_management(Output_Layer, "NEW_SELECTION", "\"Irr_Dry\" = 'DRYLAND'")

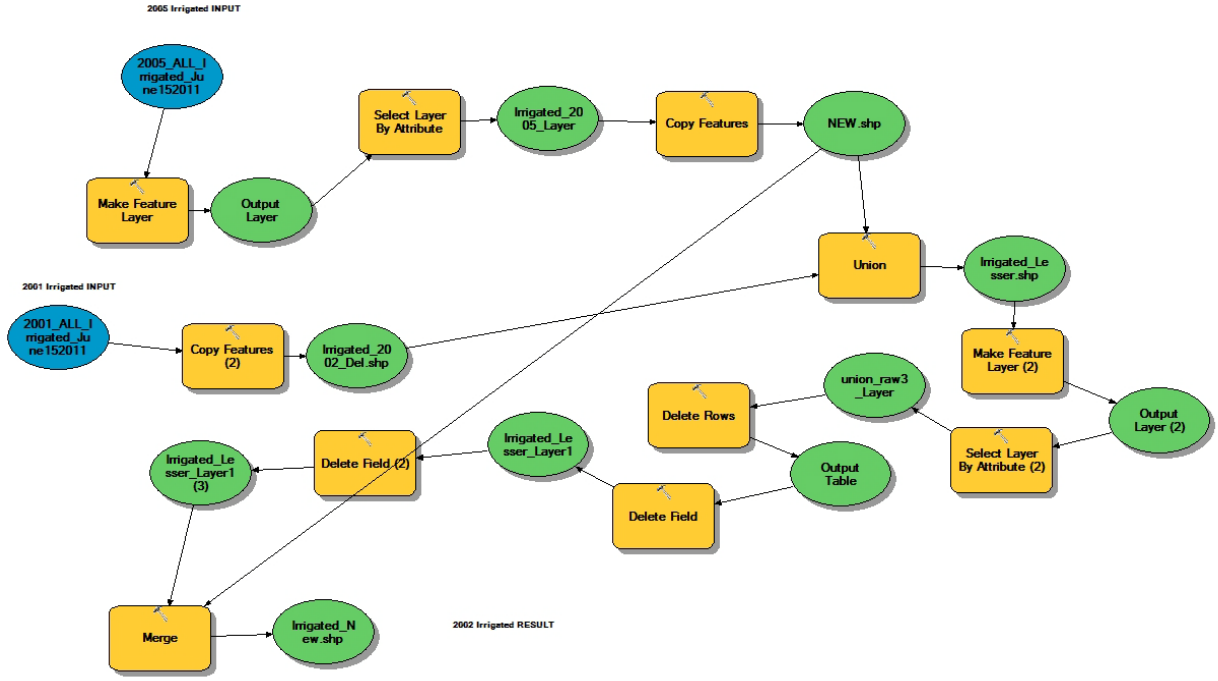
 # Process: Copy Features (2)
arcpy.CopyFeatures_management(Output_Layer, Dryland_result_shp, "", "0", "0", "0")
 # Process: Delete Field
arcpy.DeleteField_management(Dryland_result_shp, "Irr_Dry;IRRIG_TYPE;CERT_NUM;COMMENTS;SW_FAC;CROP1;CROP1_COV;CROP2;CROP2_COV;CROP3;CROP3_COV;CROP4;CROP4_COV;CRP_SRC;IRRIG_TY_1;CERT_NUM_1;SW_FAC_1;COMMENTS_1;CROP1_1;CROP1_CO_1;CROP2_1;CROP2_CO_1;CROP3_1;CROP3_CO_1;CROP4_1;CRP_SRC_1;CROP4_CO_1;FID_CopyAl;Delete;Irr_DryFID_CopyAl;ID;IRRIGATION;SOURCE;IRR_TYPE;SUB_ID;CERT_ACTIV;FIRS

T_IRR;SW;GW;SW_FACILIT;NAME;SHAPE_AREA;IMAGE;PERMIT_NO;MODEL_YR;FID_All_Ir;Parcel_I_1;Cal_Year_1;Acres_1;URF_ID_1;Subarea_1;Subarea;County_1;Irr_Dry_1;ID_1;IRRIGATI_1;SOURCE_1;IRR_TYPE_1;SUB_ID_1;CERT_ACT_1;FIRST_IR_1;SW_1;GW_1;SW_FACIL_1;NAME_1;SHAPE_AR_1;IMAGE_1;PERMIT_N_1;MODEL_YR_1;ORIG_FID")
 # Process: Delete Field
arcpy.DeleteField_management(DRYLAND, "Irr_Dry;")
arcpy.DeleteField_management(IRRIGATED, "Irr_Dry;")
 # Process: Select Layer By Attribute (2)
arcpy.SelectLayerByAttribute_management(Output_Layer, "NEW_SELECTION", "\"Irr_Dry\" = 'IRRIGATED'")
 # Process: Copy Features (3)
arcpy.CopyFeatures_management(Output_Layer, Irrigated_Result_shp, "", "0", "0", "0")
 # Process: Delete Field (2)
arcpy.DeleteField_management(Irrigated_Result_shp, "Irr_Dry;SW_FAC;CRP_SRC_1;Delete;Irr_Dry;FID_CopyAl;Parcel_ID;Cal_Year;Acres;URF_ID;Subarea;County;FID_All_Ir;Parcel_I_1;Cal_Year_1;Acres_1;URF_ID_1;Subarea_1;County_1;Irr_Dry_1;ID_1;IRRIGATI_1;SOURCE_1;IRR_TYPE_1;SUB_ID_1;CERT_ACT_1;FIRST_IR_1;SW_1;GW_1;SW_FACIL_1;NAME_1;SHAPE_AR_1;IMAGE_1;PERMIT_N_1;MODEL_YR_1;ORIG_FID")
 # Delete Intermediate Data:
arcpy.Delete_management(CopyAll_Irr_Dry_Areas)
arcpy.Delete_management(Dry_Irr_INT)
arcpy.Delete_management(All_Irr_Dry_Areas_U)
arcpy.Delete_management(All_Irr_Dry_Areas)
arcpy.Delete_management(IRRAreas_Broken)
arcpy.Delete_management(Irrigated_Result_shp)

North Platte and South Platte NRD Interim Attribution Tool

 # ----------
 # Calc_Fields.py
 # Created by Leonard Rice Engineers, Inc. Denver CO, 80211
 # This script is used to recalculate Parcel_ID, Acres, and Cal_Year for each Interim Data Set
 # ----------
 # Import arcpy module
import arcpy
 # Set My Variables:
#INPUT varialbe asks the user to input a shapefile
INPUT = arcpy.GetParameterAsText(0)
#Year variable asks the user to enter in the active year that this dataset is applicable to
YEAR = arcpy.GetParameterAsText(1)
 # Process: Calculate Acres in the Acres Field:
arcpy.CalculateField_management(INPUT, "Acres", "\" !shape.area@acres!\"", "PYTHON_9.3", "")
 # Process: Calculate Parcel_ID Field:
arcpy.CalculateField_management(INPUT, "Parcel_ID", "[FID] + 1", "VB", "")
 # Process: Calculate Cal_Year Field
arcpy.CalculateField_management(INPUT, "Cal_Year", YEAR, "VB", "")
 # Process: Delete Field (2)
arcpy.DeleteField_management(INPUT, "IRR_DRY")

SPNRD Interim Irrigated Tool

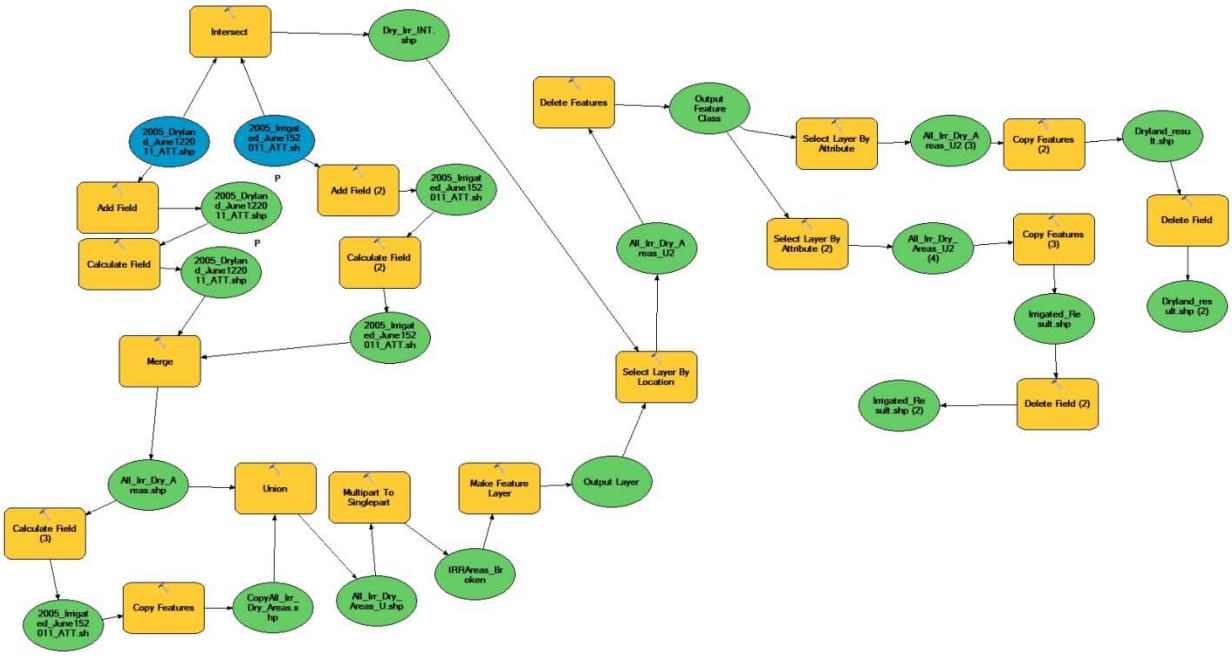



```
# ---------------------------------------------------------------------------
# INTERIM.py
# Created on: 2011-06-23 15:36:28.00000
#   (generated by ArcGIS/ModelBuilder)
# Description: This script generates interim irrigated shapefiles.
# ---------------------------------------------------------------------------
# Import arcpy module
import arcpy
# Local variables:
Ginput = arcpy.GetParameterAsText(0)
Linput = arcpy.GetParameterAsText(1)
WORKSPACE = arcpy.GetParameterAsText(2)
SQL = arcpy.GetParameterAsText(3)
Greater_Copy = str(WORKSPACE) + "\\Greater_Copy.shp"
CO_and_GW_Stats_shp = str(WORKSPACE) + "\\Comingled_GW_Stats.shp"
Irrigated_2005_Layer = "Ginput"
NEW_shp = str(WORKSPACE) + "\\NEW.shp"
Irrigated_Interim_Del = str(WORKSPACE) + "\\Irrigated_Interim_Del.shp"
Irrigated_Lesser_shp = str(WORKSPACE) + "\\Irrigated_Lesser.shp"
Output_Layer__2_ = str(WORKSPACE) + "\\Irrigated_Lesser1.shp"
Output_Layer__3_ = str(WORKSPACE) + "\\Irrigated_INTERIM_resultwf.shp"
Irrigated_New_shp = str(WORKSPACE) + "\\Irrigated_INTERIM_result.shp"
# Process: Copy Features (2)
arcpy.CopyFeatures_management(Linput, Irrigated_Interim_Del, "", "0", "0", "0")
# Process: Make Feature Layer
arcpy.MakeFeatureLayer_management(Ginput, Greater_Copy, "", "", "")
# Process: Select Layer By Attribute
arcpy.SelectLayerByAttribute_management(Greater_Copy, "NEW_SELECTION", SQL)
# Process: Copy Features
arcpy.CopyFeatures_management(Greater_Copy, NEW_shp, "", "0", "0", "0")
# Process: Union
arcpy.Union_analysis([Irrigated_Interim_Del, NEW_shp], Irrigated_Lesser_shp, "ALL", "", "GAPS")
```

```
# Process: Make Feature Layer (2)
arcpy.MakeFeatureLayer_management(Irrigated_Lesser_shp, Output_Layer__2_, "", "", "")
# Process: Select Layer By Attribute
arcpy.SelectLayerByAttribute_management(Output_Layer__2_, "NEW_SELECTION", "NOT CAL_YEAR_1 = 0")
# Process: Delete Rows
arcpy.DeleteRows_management(Output_Layer__2_)
# Process: Delete Field
arcpy.DeleteField_management(Output_Layer__2_, "FID_Irriga;FID_NEW;PARCEL_I_1;CAL_YEAR_1;ACRES_1;IRR_TYPE_1;SW_1;GW_1;ID_1;FIRST_IR_1;CERT_ACT_1;SOURCE_1;SW_FAC_1;PERMIT_N_1;COUNTY_1;URF_ID_1;SUBAREA_1;CROP1_1;CROP1_CO_1;CROP2_1;CROP2_CO_1;CROP3_1;CROP3_CO_1;CROP4_1;CROP4_CO_1;CRP_SRC_1")

# Process: Merge
arcpy.Merge_management([NEW_shp, Irrigated_Lesser_shp], Irrigated_New_shp, "")
# Process: Calculate Field
arcpy.CalculateField_management(Irrigated_New_shp, "Acres", "\" !shape.area@acres!\"", "PYTHON_9.3", "")
# Process: Make Feature Layer (2)
arcpy.MakeFeatureLayer_management(Irrigated_New_shp, Output_Layer__3_, "", "", "")
# Process: Select Layer By Attribute
arcpy.SelectLayerByAttribute_management(Output_Layer__3_, "NEW_SELECTION", "\"Acres\" < .5")
#Delete Rows with Less than .5 Acres in the Parcel
arcpy.DeleteRows_management(Output_Layer__3_)
arcpy.DeleteField_management(Output_Layer__3_, "Irr_Dry")
#Generate Statistics shapefile for QC of co-mingled and GW only parcels.
arcpy.CalculateField_management(NEW_shp, "Acres", "\" !shape.area@acres!\"", "PYTHON_9.3", "")
arcpy.Dissolve_management (NEW_shp, CO_and_GW_Stats_shp, "ID", "ACRES SUM;ID COUNT", "MULTI_PART", "DISSOLVE_LINES")
# Process: Table to dBASE (multiple)
arcpy.TableToDBASE_conversion(CO_and_GW_Stats_shp, WORKSPACE)
#Delete Intermediate Data:
arcpy.Delete_management(NEW_shp)
arcpy.Delete_management(Irrigated_Lesser_shp)
arcpy.Delete_management(Irrigated_Interim_Del)
arcpy.Delete_management(CO_and_GW_Stats_shp)
```

SPNRD Interim Topology Tool




```
# ---------------------------------------------------------------------------
# Topology3.py
# Created on: 2011-06-22 13:10:01.00000
#   (generated by ArcGIS/ModelBuilder)
# Description:  This script is used to generate interim dryland shapefiles by removing intersecting
# polygons
# ---------------------------------------------------------------------------
# Import arcpy module
import arcpy
from arcpy import *
# Local variables:
IRRIGATED = arcpy.GetParameterAsText(0)
DRYLAND = arcpy.GetParameterAsText(1)
WORKSPACE = arcpy.GetParameterAsText(2)
All_Irr_Dry_Areas = str(WORKSPACE) + "\\All_Irr_Dry_Areas.shp"
All_Irr_Dry_Areas_U__2_ = str(WORKSPACE) + "\\All_Irr_Dry_Areas_U.shp"
Dry_Irr_INT = str(WORKSPACE) + "\\Dry_Irr_INT.shp"
All_Irr_Dry_Areas_U = str(WORKSPACE) + "\\All_Irr_Dry_Areas_U.shp"
IRRAreas_Broken = str(WORKSPACE) + "\\All_Irr_Dry_Areas_U2.shp"
CopyAll_Irr_Dry_Areas =str(WORKSPACE) +  "\\CopyAll_Irr_Dry_Areas.shp"
Dryland_result_shp = str(WORKSPACE) + "\\Dryland_result.shp"
Irrigated_Result_shp = str(WORKSPACE) + "\\Irrigated_Result.shp"
Output_Layer = str(WORKSPACE) + "\\All_Irr_Dry_Areas_U_layer"
# Process: Add Field
arcpy.AddField_management(DRYLAND, "Irr_Dry", "TEXT", "", "", "50", "", "NON_NULLABLE",
"NON_REQUIRED", "")
# Process: Calculate Field
arcpy.CalculateField_management(DRYLAND, "Irr_Dry", "\"DRYLAND\"", "VB", "")
# Process: Add Field (2)
arcpy.AddField_management(IRRIGATED, "Irr_Dry", "TEXT", "", "", "50", "", "NON_NULLABLE",
"NON_REQUIRED", "")
# Process: Calculate Field (2)
```

arcpy.CalculateField_management(IRRIGATED, "Irr_Dry", "\"IRRIGATED\"", "VB", "")
 # Process: Merge
arcpy.Merge_management([DRYLAND, IRRIGATED], All_Irr_Dry_Areas, "")
 # Process: Calculate Field (3)
#arcpy.CalculateField_management(All_Irr_Dry_Areas_shp, "PARCEL_ID", "[FID] + 1", "VB", "")
 # Process: Copy Features
arcpy.CopyFeatures_management(All_Irr_Dry_Areas, CopyAll_Irr_Dry_Areas, "", "0", "0", "0")
 # Process: Union
arcpy.Union_analysis([All_Irr_Dry_Areas, CopyAll_Irr_Dry_Areas], All_Irr_Dry_Areas_U, "ALL", "", "GAPS")
 # Process: Multipart To Singlepart
arcpy.MultipartToSinglepart_management(All_Irr_Dry_Areas_U, IRRAreas_Broken)

 # Process: Intersect
arcpy.Intersect_analysis([DRYLAND, IRRIGATED], Dry_Irr_INT, "ALL", "", "INPUT")
 # Process: Make Feature Layer
arcpy.MakeFeatureLayer_management(All_Irr_Dry_Areas_U, Output_Layer, "", "", "FID FID VISIBLE NONE;FID_CopyAl FID_CopyAl VISIBLE NONE;Shape Shape VISIBLE NONE;Parcel_ID Parcel_ID VISIBLE NONE;Cal_Year Cal_Year VISIBLE NONE;Acres Acres VISIBLE NONE;URF_ID URF_ID VISIBLE NONE;Subarea Subarea VISIBLE NONE;County County VISIBLE NONE;Irr_Dry Irr_Dry VISIBLE NONE;ID ID VISIBLE NONE;IRRIGATION IRRIGATION VISIBLE NONE;SOURCE SOURCE VISIBLE NONE;IRR_TYPE IRR_TYPE VISIBLE NONE;SUB_ID SUB_ID VISIBLE NONE;CERT_ACTIV CERT_ACTIV VISIBLE NONE;FIRST_IRR FIRST_IRR VISIBLE NONE;SW SW VISIBLE NONE;GW GW VISIBLE NONE;SW_FACILIT SW_FACILIT VISIBLE NONE;NAME NAME VISIBLE NONE;SHAPE_AREA SHAPE_AREA VISIBLE NONE;IMAGE IMAGE VISIBLE NONE;PERMIT_NO PERMIT_NO VISIBLE NONE;MODEL_YR MODEL_YR VISIBLE NONE;Parcel_I_1 Parcel_I_1 VISIBLE NONE;Cal_Year_1 Cal_Year_1 VISIBLE NONE;Acres_1 Acres_1 VISIBLE NONE;URF_ID_1 URF_ID_1 VISIBLE NONE;Subarea_1 Subarea_1 VISIBLE NONE;County_1 County_1 VISIBLE NONE;Irr_Dry_1 Irr_Dry_1 VISIBLE NONE;ID_1 ID_1 VISIBLE NONE;IRRIGATI_1 IRRIGATI_1 VISIBLE NONE;SOURCE_1 SOURCE_1 VISIBLE NONE;IRR_TYPE_1 IRR_TYPE_1 VISIBLE NONE;SUB_ID_1 SUB_ID_1 VISIBLE NONE;CERT_ACT_1 CERT_ACT_1 VISIBLE NONE;FIRST_IR_1 FIRST_IR_1 VISIBLE NONE;SW_1 SW_1 VISIBLE NONE;GW_1 GW_1 VISIBLE NONE;SW_FACIL_1 SW_FACIL_1 VISIBLE NONE;NAME_1 NAME_1 VISIBLE NONE;SHAPE_AR_1 SHAPE_AR_1 VISIBLE NONE;IMAGE_1 IMAGE_1 VISIBLE NONE;PERMIT_N_1 PERMIT_N_1 VISIBLE NONE;MODEL_YR_1 MODEL_YR_1 VISIBLE NONE;ORIG_FID ORIG_FID VISIBLE NONE")
 # Process: Select Layer By Location
arcpy.SelectLayerByLocation_management(Output_Layer, "ARE_IDENTICAL_TO", Dry_Irr_INT, "", "NEW_SELECTION")
 # Process: Add Field (2)
arcpy.AddField_management(Output_Layer, "Delete", "TEXT", "", "", "50", "", "NON_NULLABLE", "NON_REQUIRED", "")
 # Process: Calculate Field (2)
arcpy.CalculateField_management(Output_Layer, "Delete", "\"DEL\"", "VB", "")
#SELECTBYATTRIBUTES
arcpy.SelectLayerByAttribute_management(Output_Layer, "NEW_SELECTION", "\"Delete\" = 'DEL'")
 # Process: Delete Features
arcpy.DeleteFeatures_management(Output_Layer)
 # Process: Select Layer By Attribute
arcpy.SelectLayerByAttribute_management(Output_Layer, "NEW_SELECTION", "\"Irr_Dry\" = 'DRYLAND'")
 # Process: Copy Features (2)
arcpy.CopyFeatures_management(Output_Layer, Dryland_result_shp, "", "0", "0", "0")
 # Process: Delete Field
arcpy.DeleteField_management(Dryland_result_shp, "Irr_Dry;IRRIG_TYPE;CERT_NUM;COMMENTS;SW_FAC;CROP1;CROP1_COV;CROP2;CROP2_COV;CROP3;CROP3_COV;CROP4;CROP4_COV;CRP_SRC;IRRIG_TY_1;CERT_NUM_1;SW_FAC_1;COMMENTS_1;CROP1_1;CROP1_CO_1;CROP2_1;CROP2_CO_1;CROP3_1;CROP3_CO_1;CROP4_1;CRP_SRC_1;CROP4_CO_1;FID_CopyAl;Delete;Irr_DryFID_CopyAl;ID;IRRIGATION;SOURCE;IRR_TYPE;SUB_ID;CERT_ACTIV;FIRS

T_IRR;SW;GW;SW_FACILIT;NAME;SHAPE_AREA;IMAGE;PERMIT_NO;MODEL_YR;FID_All_Ir;Parcel_I_1;Cal_Year_1;Acres_1;URF_ID_1;Subarea_1;Subarea;County_1;Irr_Dry_1;ID_1;IRRIGATI_1;SOURCE_1;IRR_TYPE_1;SUB_ID_1;CERT_ACT_1;FIRST_IR_1;SW_1;GW_1;SW_FACIL_1;NAME_1;SHAPE_AR_1;IMAGE_1;PERMIT_N_1;MODEL_YR_1;ORIG_FID")

 # Process: Delete Field

arcpy.DeleteField_management(DRYLAND, "Irr_Dry;")
arcpy.DeleteField_management(IRRIGATED, "Irr_Dry;")

 # Process: Select Layer By Attribute (2)

arcpy.SelectLayerByAttribute_management(Output_Layer, "NEW_SELECTION", "\"Irr_Dry\" = 'IRRIGATED'")

 # Process: Copy Features (3)

arcpy.CopyFeatures_management(Output_Layer, Irrigated_Result_shp, "", "0", "0", "0")

 # Process: Delete Field (2)

arcpy.DeleteField_management(Irrigated_Result_shp, "Irr_Dry;SW_FAC;CRP_SRC_1;Delete;Irr_Dry;FID_CopyAl;Parcel_ID;Cal_Year;Acres;URF_ID;Subarea;County;FID_All_Ir;Parcel_I_1;Cal_Year_1;Acres_1;URF_ID_1;Subarea_1;County_1;Irr_Dry_1;ID_1;IRRIGATI_1;SOURCE_1;IRR_TYPE_1;SUB_ID_1;CERT_ACT_1;FIRST_IR_1;SW_1;GW_1;SW_FACIL_1;NAME_1;SHAPE_AR_1;IMAGE_1;PERMIT_N_1;MODEL_YR_1;ORIG_FID")

#Delete Intermediate Data:

arcpy.Delete_management(CopyAll_Irr_Dry_Areas)
arcpy.Delete_management(Dry_Irr_INT)
arcpy.Delete_management(All_Irr_Dry_Areas_U)
arcpy.Delete_management(All_Irr_Dry_Areas)
arcpy.Delete_management(IRRAreas_Broken)
arcpy.Delete_management(Irrigated_Result_shp)

Appendix E: WWUM Model/COHYST Comparison

WWUM Model Irrigated & Dryland Acreage Assessment

Appendix E – WWUM Model/COHYST GW Only Acreage Comparison

A comprehensive irrigated acreage assessment was completed through the Cooperative Hydrology Study (COHYST) effort, and has been refined as recently as 2008. Land use datasets for the entire COHYST area, which encompasses roughly a third of the state, were developed for 1982, 1997, 2001, and 2005 assessment years using corresponding Landsat remotely-sensed imagery. The land use datasets focused on the classification of crop and non-crop types throughout the region to estimate total irrigated and dryland acres, and ultimately the irrigation water use in the area. In contrast, the WWUM Model acreage assessment included the North and South Platte NRD areas only and focused on the delineation of irrigated and dryland acreage from aerial imagery, and attributing the acreage with water source, crop type, and irrigation method.

One application of the COHYST assessment was to estimate stream depletions for each NRD based on the gain/loss of ground water only lands over the 1997 to 2005 period. This same gain/loss analysis can be performed using the resulting acreage information from the WWUM Model assessment, and this memorandum summarizes a common approach to quantifying the change in ground water only acreage over 1997 through 2005 period for the NRDs using the acreage information from the COHYST and WWUM Model assessments.

COHYST Approach

The approach used to summarize the change in COHYST ground water only acres over the 1997 to 2005 was summarized by Richard Luckey in the June 10, 2008 report *Estimated Stream Baseflow Depletions by Natural Resource District in Nebraska North Platte Basin due to Gained and Lost Groundwater Irrigated Land after July 1, 1997.* The report provides both a summary of the approach used to quantify the change in ground water only acreage, and tabulates the results by county and NRD. To ensure an accurate explanation of the approach, the following paragraphs were taken directly from the report.

> ***Changes in Irrigated Land (Page 8, Paragraph 3)***
>
> *Changes in groundwater irrigated land were estimated using the 1997 land-use map (Dappen and Tooze, 2001), the 2001 land-use map (Dappen and Merchant, 2003), and the 2005 land-use map (Dappen and others, 2006). These three reports on land use were developed using Landsat remote sensing imagery, Farm Service Administration field data, and ground truth data collected by the Natural Resources Districts. The 1997, 2001, and 2005 land-use maps contained polygons showing irrigated lands. For 1997 and 2001, the polygons were registered to each other based on the centroids of the polygons. This registration resulted in small shifts, principally on center pivots. The 1997 polygons were then subtracted from the 2001 polygons in a geographical sense to produce polygons that indicated an increase in irrigated land between 1997 and 2001 (gained irrigated land). In a similar manner, the 2001 polygons were subtracted from the 1997 polygons to produce polygons that indicated a decrease in irrigated land between 1997 and 2001 (lost irrigated land). Polygons with areas less than 1 acre were removed because they were unlikely to represent real gains or losses in irrigated lands. Polygons whose centroids fell within a surface water irrigation district were deleted because these were assumed to be irrigated with surface*

water and only temporarily gained or lost irrigated land. Because these surface-water polygons were deleted, gained or lost irrigated land really means gained or lost ***groundwater irrigated land*** *throughout this report.*

Some of the remaining polygons consisted of two concentric circles or parts of circles with a thin strip between them indicating either an increase or a decrease in irrigated land. These concentric circle polygons were due to imperfect field boundaries and are called edge effects here. The area of each 1997 to 2001 gained or lost irrigated land polygon was divided by its perimeter. For a 120 acre circle, the ratio of area divided by perimeter is 645. For an 80 acre rectangle that is 1,320 feet by 2,640 feet, the ratio of area divided by perimeter is 440. Edge effect polygons have much smaller ratios. Analysis indicated that deleting those 1997 to 2001 gained or lost irrigated land polygons with ratios of less than 100 removed most of the edge effect fields without removing real fields. The remaining polygons were deemed a map of estimated gained or lost irrigated land after July 1, 1997, and before June 30, 2001.

A similar process was used for 2001 to 2005, although these maps generally used the same field boundaries so edge effects were less pronounced for 2001 to 2005. As with 1997 to 2001, polygons with areas less than 1 acre were discarded as were polygons with area to perimeter ratios of less than 100. The remaining polygons were deemed a map of estimated gained or lost irrigated land after July 1, 2001, and before June 30, 2005.

This approach resulted in the amount of ground water only irrigated acreage in 1997 and the amount of ground water only acreage gained or lost acres in both the 2001 and 2005 assessments, which was used to estimate COHYST's ground water only acres for 1997, 2001 and 2005.

Common Approach

For the purposes of the comparison in this memorandum, the key points from the COHYST approach were used to develop a common approach, one that was used to compare the net change in ground water only acreages from the WWUM Model and COHYST assessments over the 1997 to 2005 period. A common approach was critical to developing a representative comparison between the two assessments, holding as many variables constant as possible to truly understand where the differences lie between the two assessments. For example, a single surface water irrigation district boundary shapefile was selected to filter out non-ground water only lands from the analysis, thus removing the variable of different irrigation district boundaries from the comparison. Note that the goal of this comparison is not to reproduce the information in the COHYST report, rather to develop a common approach to evaluate the differences between the two assessments.

The common approach for this memorandum is:

1. Merge the two COHYST acreage shapefiles together to develop a single irrigated acreage shapefile for 1997 (97_pivot_update.shp & other_irrigation_97.shp) and 2005 (pivots_2005.shp & other_irr_2005.shp). Note that there are several instances where polygons in the "Pivot" shapefile overlap polygons in the "Other" shapefile, therefore the shapefiles were dissolved to eliminate the potential of double-accounting acreage included in both of the shapefiles.

2. Develop a "filter" shapefile using the Union function and the NRD boundaries, counties and the WWUM Model surface water irrigation district shapefiles. The "filter" shapefile attributes were generalized to classify areas inside or outside surface water irrigation districts contained in each county.

3. Intersect the 1997 and 2005 COHYST shapefiles with the "filter" shapefile and removing any parcels, or portions of parcels, that are located outside of the NRD boundaries. Parcels, or portions of parcels, that are located inside NRD boundaries are then attributed with a county and as either inside or outside of the surface water irrigation district.

4. Tabulate parcels, or portions of parcels, in the 1997 and 2005 COHYST shapefiles that are assigned to outside a surface water irrigation district. This results in a summary of the 1997 and 2005 COHYST acreage served by ground water only.

5. Intersect the 1997 and 2005 WWUM Model shapfiles with the "filter" shapefile and removing any parcels, or portions of parcels, that are located outside of the NRD boundaries. Parcels, or portions of parcels, that are located inside NRD boundaries are then attributed with a county and as either inside or outside of the surface water irrigation district.

6. Tabulate parcels, or portions of parcels, in the 1997 and 2005 WWUM Model shapefiles that are assigned to outside a surface water irrigation district. This results in a summary of the 1997 and 2005 WWUM Model acreage served by ground water only.

7. For each assessment, tabularly subtract the 1997 ground water only acreage from the 2005 ground water only acreage and summarize the results by county and NRD.

The WWUM Model assessment was assigned and attributed with counties and NRDs, however in maintaining a common approach, the raw acreage polygons from the WWUM Model were used to assign parcels in this comparison analysis. Likewise, the WWUM Model assessment includes ground water only parcels inside surface water irrigation district boundaries based on water supply information from the NRDs. These assignments were not used for this comparison, again because of the effort to maintain a common approach.

Table 1 and **2** below summarizes the COHYST and WWUM Model ground water only acreage information by county and NRD, respectively.

Table 1: COHYST Ground Water Only Acreage, 1997 and 2005

Acreage Assessment	North Platte NRD					NPNRD Total
	Banner	Garden	Morrill	Scotts Bluff	Sioux	
1997 GW Only Irrigated Acreage	26,818	27,164	49,049	4,867	6,412	**114,311**
2005 GW Only Irrigated Acreage	26,281	29,883	50,003	3,820	5,990	**115,978**
1997-2005 Net Change	-537	2,719	954	-1,047	-422	**1,667**

Acreage Assessment	South Platte NRD			SPNRD Total	COHYST Model Total
	Cheyenne	Deuel	Kimball		
1997 GW Only Irrigated Acreage	54,556	16,960	30,167	**101,683**	**215,995**
2005 GW Only Irrigated Acreage	59,991	19,345	36,612	**115,948**	**231,926**
1997-2005 Net Change	5,435	2,384	6,445	**14,265**	**15,932**

Table 2: WWUM Model Ground Water Only Acreage, 1997 and 2005

Acreage Assessment	North Platte NRD					NPNRD Total
	Banner	Garden	Morrill	Scotts Bluff	Sioux	
1997 GW Only Irrigated Acreage	28,527	28,703	51,287	3,964	6,265	**118,746**
2005 GW Only Irrigated Acreage	27,668	31,354	52,444	3,903	6,807	**122,176**
1997-2005 Net Change	-859	2,650	1,157	-61	542	**3,429**

Acreage Assessment	South Platte NRD			SPNRD Total	WWUM Model Total
	Cheyenne	Deuel	Kimball		
1997 GW Only Irrigated Acreage	54,189	17,937	33,091	**105,217**	**223,964**
2005 GW Only Irrigated Acreage	62,180	19,186	40,003	**121,369**	**243,545**
1997-2005 Net Change	7,991	1,249	6,911	**16,152**	**19,581**

Conclusions and Observations

Table 3 summarizes the differences between the net change in ground water only acres from the COHYST and WWUM Model assessments for the North and South Platte NRDs using the common approach discussed above.

Table 3: COHYST & WWUM Model Comparison of Change in 1997-2005 Ground Water Acreage

1997 – 2005 Net Change	North Platte NRD					NPNRD Total
	Banner	Garden	Morrill	Scotts Bluff	Sioux	
WWUM Model	-859	2,650	1,157	-61	542	**3,429**
COHYST	-537	2,719	954	-1047	-422	**1,667**
WWUM Model less COHYST Acreage	-322	-68	203	986	964	**1,763**

1997 – 2005 Net Change	South Platte NRD			SPNRD Total	Total
	Cheyenne	Deuel	Kimball		
WWUM Model	7,991	1,249	6,911	**16,152**	**19,581**
COHYST	5,435	2,384	6,445	**14,265**	**15,932**
WWUM Model less COHYST Acreage	2,556	-1,135	466	**1,887**	**3,650**

In general, the COHYST and WWUM Model results are very close, especially in terms of the percentage of the total ground water acreage in the areas. For example, the difference between the two efforts' 1997 to 2005 net change in ground water only acreage of 3,650 is less than 2 percent of either COHYST's or WWUM Model's 2005 total NRD ground water only acres. Counties with a higher disparity between COHYST and WWUM Model include Scotts Bluff, Sioux, and Deuel. Due to the fact that topological issues with the COHYST coverages (e.g. overlapping polygons, multi-part polygons) were addressed in the common approach, the main difference between the COHYST and WWUM Model net change in ground water only acreage can be attributed to differences in the delineation of ground water only irrigated acreage. The following summarizes the observed acreage delineation differences:

- *Inconsistent parcel boundary delineation*: Parcel boundaries can and should change from year to year if the irrigated acreage reflected by a parcel boundary increases or decreases in size. If the parcel does not change in size, but the delineation of the parcel changes from year to year, this creates an artificial increase or decrease in acreage (e.g. "edge effects") due to "imperfect field boundaries" as discussed in the COHYST report. In reviewing the COHYST acreage, the "edge effect" acreage tends to be a result of 1997 parcel boundaries that are larger than the 2005 parcel boundaries. Tabuarly, this results in an artificial reduction in COHYST acreage between 2005 and 1997. This appears to be the main cause of disparity in Sioux County, whereby both COHYST and WWUM Model generally identified the same irrigated parcels. Note that due to the use of aerial imagery for parcel boundary delineation, and the continuity between the acreage assessment years, the "edge effects" are negligible in the WWUM Model effort.

- *Use of NRD Information:* The NRDs undertook great efforts to delineate the parcel boundaries of irrigated lands that are served by a ground water source, and indicate the date the parcel was first irrigated. In general, for lands outside of a surface water irrigation district, if the NRDs did not delineate the parcel, it does not have an irrigation source and is not irrigated. The WWUM Model acreage assessment used this NRD information, comparing it to the aerial imagery, with very few changes. Any major changes were presented to the NRDs and further review of the parcel in question, including on-the-ground review, was undertaken to verify the change. Using this NRD information was critical during the WWUM Model 1997 assessment, in which the 1997 Land Use information was supplemented with 1999 aerial imagery (1997 imagery was not available). The WWUM Model could then use the NRD information to make a more informed decision on whether parcels were irrigated in 1997. This refined NRD information was likely not available during the COHYST effort, resulting in both the delineation of parcels without a known water source and exclusion of parcels with an irrigation source that appear irrigated in the aerial imagery. An example of the latter occurs in Cheyenne County, in which the two efforts identified nearly the same amount of irrigated acreage in 1997, and, using NRD information, the WWUM Model identified approximately more 2,000 acres of ground water only land in 2005.
- *Identification of Non-Agricultural Acreage*: The WWUM Model excluded non-agricultural acreage from its assessment, including golf courses, parks, and cemeteries. The COHYST report does not appear to discuss these lands, however upon review of the COHYST acreage shapefiles, non-agricultural lands were included in some instances. An example of this difference occurs in Kimball County, in which the COHYST effort delineated a golf course approximately 150 acres in size.

In many cases, these acreage delineation differences all take place in a single county to account for the overall differences between the two efforts' net change in ground water only acreage. Despite these differences however, the COHYST and WWUM Model results are relatively close. Refined NRD information, aerial imagery, and continuity through the assessment resulted in a more comprehensive and accurate acreage assessment for the WWUM Model.